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No magic bullets: a mixed methods case study to evaluate the implementation of an e-health system designed to support evidence-based practice in primary and community care settings.

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**No magic bullets: a mixed methods case study to
evaluate the implementation of an e-health system
designed to support evidence-based practice in primary
and community care settings.**

Colin Simon Cohen

A thesis submitted for the degree of Professional Doctorate in Health

University of Bath

Department of Health

April 2014

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Signed on behalf of the Faculty of Humanities and Social Sciences

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To Christine, Hannah and Sophie.

Abstract

The literature on e-health systems is frequently characterised by reports of success accompanied by the promise of a bright future, but the future never seems to arrive. The story of health informatics in England over the last decade has been dominated by the NHS National Programme for IT.

One element of that programme is the Map of Medicine, a software tool designed to deliver evidence-based clinical knowledge from authoritative sources. Although the system had been made available to users across the NHS, very little was known about whether health professionals actually used it. The aim of this project was to undertake a mixed methods case study to evaluate the implementation of the Map of Medicine in primary and community care settings.

The main findings from the quantitative phase of the case study were that around half of the GPs and around a quarter of Community health staff used the system. The findings from the qualitative phase indicated some marked differences between the two groups in terms of why they did, or did not, use the system. Normalisation Process Theory was used as a lens to understand how practices became embedded, or failed to become embedded, into their social context. It is concluded that emphasising the technical aspects of system implementation at the expense of the social aspects probably accounted for much of the variation in use, but there are no simple project management checklists that can guarantee successful implementation.

Finally, the implications are considered. Policy makers need to take account of the social factors when implementing e-health systems, to recognise that it can take a long time for systems to become normalised and that there are risks from withdrawing project support before changes in working practices have become embedded. The health informatics profession needs to become more evidence-based, and the evaluation of e-health should play the same role as clinical audit does for the medical profession.

Abbreviations and glossary of terms

Abbreviation	Description
ANT	Actor Network Theory.
ASSIST	The Association for Informatics Professionals in Health and Social Care.
BMJ	British Medical Journal.
BNF	British National Formulary.
BT	British Telecom.
CCG	Clinical Commissioning Group.
CfH	Connecting for Health.
CFHEP	Connecting for Health Evaluation Programme.
Choose and Book	A national electronic referral service used in the NHS, which gives patients a choice of place, date and time for their first outpatient appointment in a hospital or clinic.
CKS	Clinical Knowledge Summaries.
CPD	Continual Professional Development.
CPOE	Computerised Physician Order Entry.
CSC	Computer Sciences Corporation.
DH	Department of Health.
DN	District Nurse.
EBP	Evidence-Based Practice.
EHR	Electronic Health Record.
First 5	A scheme run by the Royal College of General Practitioners for newly qualified GPs in their first 5 years of practice as a GP.
FY2	Foundation Year 2. The Foundation Programme is a compulsory 2 year postgraduate training programme for newly qualified medical practitioners.
GP	General Practitioner.
GP2GP	General Practitioner to General Practitioner (record transfer). A project that is part of the National Programme for Information Technology.
Health Informatics	The knowledge, skills and tools which enable information to be collected, managed, used and shared to support the delivery of healthcare and promote health.
HSJ	Health Service Journal
HV	Health Visitor.
ISD	Informatics Skills Development Network.
IT	Information Technology.
LSP	Local Service Provider.
MoM	Map of Medicine.
NAO	National Audit Office.

NHS	National Health Service.
NHS Athens	An access management system which enables eligible users to access online information resources purchased by the NHS.
NHS Evidence	A service that enables access to authoritative clinical and non-clinical evidence and best practice through a web-based portal.
NICE	National Institute for Health and Clinical Excellence.
NPfIT	National Programme for Information Technology.
NPM	Normalisation Process Model
NPT	Normalisation Process Theory.
NVivo	A computer software package for analysing qualitative data.
OBS	Output Based Specification.
PACS	Picture Archiving and Communications System.
PCT	Primary Care Trust.
PD	Professional Doctorate
PRINCE 2	Projects IN Controlled Environments, a methodology for managing projects.
Pub Med	A database that provides access to references on life sciences and biomedical topics.
QIPP	Quality, Innovation, Productivity and Prevention.
QOF	Quality and Outcomes Framework
R&D	Research and Development.
RCT	Randomised Control Trial.
SCR	Summary Care Record.
SHA	Strategic Health Authority.
Sociotechnical approach	An approach based on the idea that organisations are both social (people, norms, culture) and technical (tools, procedures, technology) and those elements are interdependent.
Target	A protected learning time scheme for General Practitioners in the PCT that was the location for the case study.
UKCHIP	United Kingdom Council for Health Informatics Professions.

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Chapter 1 - Introduction

"Knowledge is the enemy of disease. The application of what we know will have a bigger impact on health and disease than any drug or technology likely to be introduced in the next decade." Sir Muir Gray, NHS Chief Knowledge Officer (Gray n.d.).

1.1 Background

The origins for this thesis lie in my experience working for over 30 years as a health informatics professional in the English National Health Service (NHS). The literature on e-health systems is frequently characterised by reports of success accompanied by the promise of a bright future, but the future never seems to arrive. The story of health informatics in England over the last decade has been dominated by the NHS National Programme for IT, and by reports that often highlight a failure to achieve the original aims of the programme. The public perception of the failure of large scale IT initiatives such as the NHS National Programme for IT masks a more complex picture, and the idea for the thesis arose from a concern to seek to understand whether the NHS really is as bad at implementing IT systems in health care as certain commentators would have us believe.

There is good evidence that e-health systems have the potential to make a significant difference to the outcomes of patient care through delivering knowledge, in the right place at the right time, to aid decisions and to prevent errors (Bates and Gawande 2003, Protti 2005, House of Commons Health Committee 2009).

Few people would question the desirability of promoting the concept of evidence-based practice in health care, and recent drivers for change in the NHS in England, such as the Darzi Report *High quality care for all* (2008) and the White Paper *Equity and Excellence: Liberating the NHS* (Department of Health 2010b), challenge the NHS to ensure that health professionals have access to the evidence base. However the increasing number of journals being published and the explosion in the number of online sources of information has led many observers to comment on the potential risks of information overload.

An important element of the NHS approach to enabling practitioners to avoid information overload and to improving knowledge management is the Map of Medicine. This software tool is designed to deliver current, evidence-based clinical knowledge from authoritative sources, and to display this knowledge in a

pathways format, reflecting the patient journey. The Map of Medicine was made available to the NHS in England as part of the NHS National Programme for IT.

It is well documented that the implementation of IT systems in health care settings can be problematic and that the potential benefits are often not fully realised (for example see Wears and Berg 2005, Collier 2009, Kellerman and Jones 2013). Although the Map of Medicine has been made available to users across the NHS under the umbrella of the NHS National Programme for IT, very little was known about whether health professionals actually use it, and if not why not. The aim of this project was to undertake a case study of the implementation of the Map of Medicine in primary and community care settings, using a sociotechnical approach, to assess the impact it has had on the promotion of evidence-based practice, and to learn lessons for the future implementation of e-health systems.

The originality of the thesis arises from the fact that very little research about the Map of Medicine has been published in peer reviewed journals. That, combined with the use of Normalisation Process Theory as a framework to evaluate the implementation of the system, is believed to be unique.

1.2 Structure of the thesis

The thesis is divided into six chapters, and these describe how the study has been undertaken.

- Chapter one provides a general introduction to the thesis.
- Chapter two presents a review of the literature. It provides a rationale for the research question and considers a range of theoretical frameworks that could be used. It includes a review of the literature on the success and failure of e-health systems in general and the NHS in particular, and outlines a range of approaches that have been taken to the evaluation of e-health systems.
- Chapter three describes the aims and methods used for the study. It provides a critical review of the methodological approaches that were considered and explains why a case study approach was selected. The research design is described, including the approach that was taken to data collection and analysis. This section also considers the ethical issues arising from the study.
- Chapter four presents the findings from the quantitative and the qualitative phases of the study. In the first section the results of the online

survey that was undertaken with NHS staff working in primary and community care settings in one local health community are reported, and those results are compared with data obtained from the relevant Strategic Health Authority and from the system supplier. In the second section the findings are presented from interviews at the macro level with staff from the Department of Health and NHS Connecting for Health, at the meso level with staff from Strategic Health Authorities and Primary Care Trusts, and at the micro level with NHS staff working in primary and community care settings.

- Chapter five discusses the findings of the study within a theoretical framework. The findings are reviewed in the context of the literature already published about the evaluation of e-health systems, and about the success or failure of those systems.
- Chapter six provides a summary of the thesis. It highlights the limitations of the study, provides a reflective commentary, describes the implications of the study for health informatics policy and practice, and makes recommendations for future research.

Chapter 2 - Literature Review

“Insanity: doing the same things over and over again, and expecting the results to be different” Albert Einstein (Wikiquote 2013a).

2.1 Introduction

The above quotation could have been written about the use of IT systems in health care. It seems as if decisions to invest in IT systems are sometimes based on the optimistic claims made by system suppliers, or by a wish to deploy those IT systems just because they are available.

The aim of this chapter is to consider the literature on the use of e-health systems in health care and the potential benefits that can be realised from using those systems. The concepts of success and failure in the implementation of e-health systems are considered, the approaches that have been taken to the evaluation of e-health systems are examined, and the theoretical framework that is considered to be best suited to the research question is discussed.

2.2 Health policy challenges

The United Kingdom faces a number of health policy challenges, and one of the most important is the ageing population. Figures published by the House of Commons Library (Cracknell 2010), quoting the Government Actuary, indicate that the number of people in the UK aged over 65 years is expected to rise from 10 million in 2010 to 15 million in 2030 and to 19 million by 2050. This is significant because a disproportionate share of health resources is consumed by the elderly population. The same report estimates that average NHS spending per year on retired households is almost double that for non-retired households and that the average annual cost of providing NHS care to someone aged 85 years or more is three times greater than for a person aged 65 to 74 years.

The second major challenge is the advance in medical technology. Innovations in diagnostic technologies, improvements in surgical procedures and in drugs to suppress the immune system are making the repair and replacement of organs much more common. In addition, advances in areas such as stem cell research and the development of new drug treatments are increasing the numbers of patients who could gain from diagnosis and treatment (Blank and Burau 2007). There is broad agreement amongst many commentators that these advances

tend to drive up costs, particularly as those technologies often enable life to be prolonged for elderly people with illnesses that may previously have been untreatable.

The third major challenge is from rising public expectations. The providers of health care and suppliers of medical technologies often stimulate demand in the general public for new medical technologies, and the perception that these new treatments should be made available, regardless of the cost, is reinforced through magazines and television programmes that emphasise the benefits of new diagnostic techniques and treatments. In a study of consumer access to health information on the internet, Scott et al (2005) investigated how consumers sought health information and how they used it. The study described how patients have become less deferential towards health professionals, and have access to a great deal more information about treatment options than was possible a few years ago. This trend is echoed in NHS policy, where the latest national information strategy *The Power of Information* (Department of Health 2012) places considerable emphasis on the provision of health information to the public and on giving patients access to their own electronic care records. This is symptomatic of the pressure on public sector organisations to “channel shift” and to respond to the expectations of consumers by adopting a range of digital channels, such as email, SMS, social media and blogs, to deliver services to the public (Power 2012).

These health policy challenges are faced by most developed countries. In England those health policy challenges, combined with the period of economic austerity, has led to what is referred to as the Quality, Innovation, Productivity and Prevention (QIPP) Challenge (Department of Health 2010a). This requires the NHS in England to achieve recurrent savings of £20 billion over the four years to 2015, which is about 5% of the overall NHS budget.

2.3 The potential of e-health

The term e-health is often used to describe IT systems that are used in health care. This is a relatively new and evolving field and there are several different definitions. For example Lilford et al (2009, p.1) provide a short definition of e-health as “*the organisation and delivery of health services and information using information technology systems*”, whereas Car et al (2008, p.7) offer a more inclusive definition as:

“The organisation and delivery of health services and information using the Internet and related technologies. The term characterises not only a technical development but also a commitment for networked, global thinking, to improve health care using information and communication technology.”

Regardless of the definition of e-health, there is good evidence that information systems have the potential to make a significant difference to the outcomes of patient care through delivering knowledge to aid decisions and to prevent errors. For example, Bates and Gawande (2003) report how the use of IT can help prevent adverse events such as prescribing errors through constraining choice on dosage and helping to alert clinicians to potentially dangerous combinations of medication, and Protti (2005) reports on several studies in the USA that claim to show how Computerised Physician Order Entry (CPOE) systems have reduced the number of medication errors in hospitals and have enabled patients to be discharged sooner. Further evidence about the benefits of e-health systems is provided by Hillestad et al (2005) who report on the types of benefits that Electronic Medical Records systems have the potential to bring, in terms of supporting preventive care by providing reminders to call patients for routine screening tests and for vaccinations, and supporting chronic disease management by providing remote monitoring of patients and information on self care to avoid unnecessary hospital visits.

Similarly, a before-and-after study of CPOE systems in four Australian hospitals by Westbrook et al (2009) showed that those systems reduced the turnaround times for tests, while in the UK, the House of Commons Health Committee Report on Patient Safety (2009) also provided evidence on the potential benefits to be gained from e-health systems, for example through the avoidance of prescribing errors. However, although these systems may have the potential to deliver benefits, those benefits may not be realised. The issue of the definition of the success and failure of e-health systems is discussed further in section 2.5.

2.4 Waiting for Godot

Although there is evidence that e-health systems have considerable potential to aid decisions and prevent errors, experience on the ground is often somewhat different from the optimistic claims made by system suppliers. The evidence about the impact of IT systems in health care has been likened to the plot of the play *Waiting for Godot* by Samuel Beckett (Wears and Berg 2005). The literature on e-health systems is frequently characterised by reports of success accompanied by the promise of a bright future that never seems to arrive. Wears and Berg state that:

“behind the cheers and high hopes that dominate conference proceedings and vendor information, the reality is that systems that are used in multiple locations, have satisfied users, and that effectively contribute to the quality and safety of care are few and far between.”
(p.1261).

In a systematic review of the effects of computerised clinical decision support systems on practitioner performance and patient outcomes, Garg et al (2005) examined 100 randomised and non-randomised trials of such systems. These included systems designed to support diagnosis, reminder systems for prevention, systems for disease management and systems for prescribing. In the majority of cases the systems showed some improvement in practitioner performance, but the effects on patient outcomes were frequently not studied and when they were the results were not able to show clinically important differences. The authors also comment on the likely determinants of the successful use of clinical decision support systems, and cite a study by Holbrook et al (2003) which identifies the failure of practitioners to actually use the system, poor usability, and poor integration into practitioner workflow as barriers to implementation. Garg also states that despite the claims of system suppliers that clinical decision support systems improve efficiency and reduce costs, the evidence to support that is limited and several studies indicate that these systems often require more time and effort from the user compared to paper-based methods.

It has been argued (Ham 2006) that the UK government was frustrated with the time it took to introduce innovation into the NHS and deliberately pursued policies based on the concept of “*creative destruction*”, as seen in the private sector where established companies may be threatened and replaced by new market entrants. For example, traditional printed newspapers are losing revenue due to the rise of online news media, and high street DVD and CD retailers have been largely replaced by online selling. Ham argues that NHS policies such as the introduction of independent sector treatment centres, patient choice and payment by results can be seen in this context, as deliberate attempts to introduce creative destruction into the NHS to force the pace of change.

The issue of resistance to change in the NHS has been investigated by Jones, Exworthy et al (2013). They argue that market-based reforms have been a feature of health policy in the NHS for several years, and that NHS managers typically employ bureaucratic coping strategies to influence policy implementation. For example their study reveals how NHS managers cope by relabelling existing initiatives as the new NHS policy, or by using national policies as a lever to enforce local plans that were encountering resistance, such as PCTs using guidance from Royal Colleges in contracts with Hospital Trusts to force the reconfiguration of services.

The concern about the gap between the potential benefits of e-health systems and experience on the ground has been identified in many countries. For example Westbrook and Braithwaite (2010) cite evidence from Australia and argue that new electronic systems have led to nursing staff running paper and electronic systems in parallel, while Collier (2009, p.E261) reports on a failed attempt to create an electronic health record system in Ontario, Canada that

was alleged to have squandered \$1 billion. More recently, Kellerman and Jones (2013) have critically reviewed a study on the use of e-health in the USA which had suggested that those systems could save \$81 billion per year, casting doubt on the feasibility of achieving those savings in the absence of fully interoperable and easy-to use systems.

It is difficult to directly compare the experience in different countries because of problems with definitions and a lack of reliable data. However studies by Protti (2007), Jha et al (2008) and Schoen et al (2009) have compared the use of e-health systems in several countries. The common theme that emerges from those studies is that good progress has been made in many countries in terms of IT in primary care, but less progress has been made in secondary care. For example, the study of eleven countries by Schoen et al found that in Australia, Italy, the Netherlands, New Zealand, Sweden and the UK electronic health records (EHRs) were almost universally used in primary care, but countries such as Canada, France and the USA lagged well behind. In a later paper Protti (2010) concludes that there is no simple reason for those variations, but that government policies appear to play a part in the more successful countries either through financial support for IT systems in countries such as Australia and the UK, or through mandating the use of electronic billing systems in countries such as New Zealand. In the UK it is argued that the introduction of the Quality and Outcomes Framework (QOF) enabled GPs to earn extra income and that this increased the use of IT systems, and a similar trend was observed in Norway where the use of EHRs enabled GPs to increase their income.

2.5 Success and failure of e-health systems

It is fairly well recognised that many new IT systems fail to meet their objectives. Clegg (2009, p.1) argues that the evidence indicates that *“around 40% of such investments are complete failures, around 40% meet some of their objectives, and around 20% can be regarded as complete successes”*, and in a similar vein Littlejohns et al (2003) estimate that about 75% of IT systems in health are considered to have failed. Whatever the actual percentage, there appears to be a disparity between the evidence-based principles that usually underpin decisions about investment in healthcare in general and the decisions that are made, often at government level, about investments in e-health systems and services.

The literature suggests that failures of information systems are not just a feature of UK government projects. Dalcher and Drevin (2003) report that in 1995, for example, 31% of software projects in the USA were cancelled, and in the following year that rose to 40%. They also report that 53% were completed after the allocated time and lacked important functionality.

In order to understand the success and failure of e-health systems, we need to consider how those concepts can be defined. Table 1 shows how Heeks (2006) suggests that such initiatives can be broken down into three broad categories.

Table 1. Categories of success and failure

<i>Category</i>	<i>Description</i>
Success	where most of the stakeholders attain their major goals and they do not experience significant undesirable outcomes.
Partial failure	where major goals are not attained or there are significant undesirable outcomes, such as the system being implemented well behind schedule or at significantly greater cost than originally estimated.
Total failure	where a system is never implemented or is implemented and rapidly abandoned.

Heeks acknowledges that this categorisation begs some questions, for example with a partial failure it is important to consider whose goals are not attained and who experiences the undesirable outcomes. Heeks, Mundy et al (1999) suggest additional types of partial failure, such as “*sustainability failure*” where an initiative succeeds initially but then falls into disuse, and “*replication failure*” where an initiative succeeds in its pilot location but that success cannot be repeated elsewhere. The authors suggest that health informatics conferences frequently report successful pilot initiatives, but the replication failures tend to go unreported.

Berg (2001) argues that the concepts of success and failure have many dimensions, and are likely to be contested between different groups such as managers, healthcare workers and patients. For example Berg suggests that success could be defined in economic terms, where a project is implemented within its budget, or it could be defined as the system being implemented on time, or in terms of it being used by most of the target audience. According to Berg success has many dimensions, such as effectiveness, efficiency, user satisfaction, or patient satisfaction. As well as being multi-dimensional it is likely that the interested parties may not agree about which dimension should be considered as the most important, and the concept of success will tend to evolve over time.

Kreps and Richardson (2007) suggest that information system failures are of particular interest, since the controversy that surrounding them will often reveal processes that are likely to be hidden in the case of projects deemed to be

successful, and the relationships between the technical and social environments can be examined. A similar point is made by McLellan (2012) who argues that the NHS has a tendency to rush from one project to the next without learning the lessons from failures as well as from successes.

The concept of producer dominance is also likely to have some influence on the extent to which new e-health systems are adopted by health professionals. The rise of consumerism in health care can be viewed as a challenge to more traditional models of professional power, by promoting a discourse about patient choice and empowerment (Newman and Vidler 2006). Despite the UK government presenting itself as the champion of consumers in the face of what are portrayed as the vested interests of the health professions, the interplay between those groups is uneven and contested. The theme of professional power is considered further in Chapter 6.

2.6 Evaluation of e-health systems

In the literature about the evaluation of e-health systems some authors have suggested that it is not feasible to make definitive statements about the relationship between input and output variables. Kushner (2002) argues that e-health programmes tend to have multiple and contested goals, their outcomes are unstable and change over time, and the causal link between process and outcome is usually interrupted by many intervening variables. It is likely that, however success is defined, the perceived success or failure of e-health programmes are due at least as much to social factors (such as culture, attitudes and group norms) as to technical factors.

Writing about the need for continuous systematic evaluation of e-health, Catwell and Sheikh (2009) have also observed that while Randomised Control Trials (RCTs) and other experimental designs may be suitable for studying events under controlled conditions, those methods are less well suited to the evaluation of e-health interventions as they do not take sufficient account of the contextual factors which tend to make a significant difference to the success or failure of the e-health intervention. They conclude that systematic evaluation matters because investment decisions should be guided by evidence, rather than by lobbying by system suppliers, political opportunism or a wish to deploy e-health systems just because they are available.

Other commentators, such as Heathfield and Buchan (1996), have pointed out that by insisting on evidence using purely positivist approaches, scarce resources are wasted on evaluations that are flawed from a methodological perspective. They also suggest that some of the benefits from e-health systems

are unlikely to become evident until many years after implementation, yet researchers frequently face demands for evidence of immediate benefits.

In a similar vein, Woods (1998) argues that it is misleading to think that technical problems require purely technical solutions, and instead suggests that a better approach is to think of the clinical workplace as a complex system where people, organisational process and technology all interact dynamically. Wears and Berg (2005, p.1262) develop this thinking further and put forward the following propositions:

1. *Organisations are simultaneously social (consisting of people, values, norms and culture) and technical (without tools, procedures and technology the people could not work);*
2. *These social and technical elements are deeply interdependent, hence the term sociotechnical systems. A change in one element affects the other;*
3. *Good design or implementation is not a technical problem but rather one of jointly optimising the combined sociotechnical system.*

Evidence about the importance of evaluation is provided by De Bont and Bal (2008) who report on a study of a telecare service in the Netherlands that had been set up to reduce the workload of ophthalmologists and optometrists working on the detection of glaucoma. Although the system met the criteria for success as defined by the project sponsors, they found that it failed to become part of everyday working practice, due to perceptions of the health professionals about changes in accountability and power.

2.6.1 Unintended consequences

There is a growing body of research literature about the unintended consequences arising from the introduction of e-health systems (Ash, Berg et al 2004; Campbell, Sittig et al 2006; Fernando, Savelyich et al 2004; Harrison, Koppel et al 2007; Yu, Zhang et al 2013). For example Ash, Berg et al report on the many instances where e-health systems appear to have led to two categories of what they describe as *silent errors*. The first category refers to errors in the process of entering and retrieving information, such as when there are several options on a screen and the wrong option is clicked. The second category refers to errors in the communication and coordination process, for example when a clinician may assume that making an entry on a computer system replaces the previous need to initiate or communicate their plans, and that orders will be carried out without any further action on their part.

One of the most striking examples of unintended consequences is reported by Han, Carcillo et al (2005) who describe how the implementation of a Computerised Physician Order Entry system led to an unexpected increase in mortality in an American children's hospital. In this hospital, before the implementation of the CPOE system, the staff in the Intensive Care Unit were alerted before a patient was admitted and could order critical tests and medication in advance of the patient's arrival. After implementation of the system, order entry was not allowed until the patient had arrived and had been fully registered on the system, leading to delays in therapies and diagnostic testing. The process of entering orders on the system took up to two minutes per test, compared with the few seconds required for paper forms. The increased time burden changed the organisation of care at the bedside. Before the CPOE system, doctors and nurses converged at the bedside to stabilise the patient. After the CPOE system was introduced it became common for one doctor to direct the treatment while a second doctor concentrated solely on entering orders on the computer. The conclusion was that the delays caused by the implementation of the CPOE system led to a statistically significant increase in mortality in the months after the system went live.

2.6.2 Sociotechnical approach

Berg, Aarts et al (2003) propose the use of sociotechnical approaches in health informatics as a way of increasing our understanding of how information systems are introduced into healthcare and become part of social practice. They cite the example of "placing an order" which at first glance may seem a simple process where a doctor conceives an order, writes it down and a nurse carries it out. However, real life situations are more complicated. Rather than an order being given by one person to another, they often arise out of a collective discussion with different doctors and nurses participating. Berg et al state that a detailed focus on the messy nature of work in the real world is required, and that systems often fail because the focus is on implementation rather than on organisational change.

The growing body of research led Clegg, Ellis et al (2010) to publish a *Manifesto for a sociotechnical approach*. They argued that any work system comprises a social system (including the staff, their working practices, job role, culture and goals) and a technical system (the tools and technologies that support and enable work processes). These elements together form a system with interacting parts. The manifesto states that the social and the technical elements of work systems need to be jointly designed, to focus on just one aspect alone is likely to be ineffective and to be a waste of time and money, and that introducing IT alone is highly unlikely to achieve significant improvements in service delivery.

An example of a sociotechnical approach is a mixed method evaluation of the NHS Summary Care Record, one of the core elements of the National Programme for IT, carried out by Greenhalgh, Stramer et al (2010a, p.2). The authors state that the theoretical framework of this approach is based on the following assumptions:

- *It is useful to think of people and technology as linked in complex, ever-changing sociotechnical networks. This centres the analysis on the “process of sociotechnical change” rather than on “implementing technologies”;*
- *In sociotechnical systems (dynamic networks of people and technologies) both people and technologies “act” (i.e. do things) but not in the same way. For example people have feelings, motives and ideas whereas technologies do not;*
- *Clinical work is complex and associated with a high degree of uncertainty and unpredictability. Even when based on standardised guidelines and protocols, clinical actions are tied to the peculiarities and contingencies of local situation.*

In their study Greenhalgh et al conclude that most e-health systems fail because, despite significant investments of time and money, health professionals simply do not use them.

2.7 Theoretical frameworks

All research relies on certain underlying assumptions about what research methods are appropriate for a given research question, and on the underlying epistemology about knowledge and how it can be obtained (Myers 1997). The sociotechnical approach is a broad term covering a number of theoretical frameworks that have been used for the evaluation of e-health systems. Although RCTs and similar experimental designs may be suitable for studying events under controlled conditions, they are not suitable for the thesis research question as such e-health programmes tend to have multiple and contested goals, their outcomes are unstable and the causal link between process and outcome is likely to be interrupted by intervening variables.

How and why things become, or fail to become, part of the routine of normal everyday work is an important issue that has engaged researchers for many years. Normalisation Process Theory has been developed to help understand how practices become embedded and integrated into their social contexts. The theory was developed because of a perception that the evaluation tools previously available did not explain why certain e-health systems failed to become routinely used in clinical settings, even where the healthcare professionals favoured their adoption and where there was significant political support (May, Mort et al 2000).

A Normalisation Process Model (NPM) was proposed (May, Finch et al 2007) as a way of understanding the potential for interventions to become embedded in everyday work, and for evaluating the reasons why proposed changes in practice may succeed or fail. That model was based on the four key constructs shown in Table 2, and the model was subsequently developed into Normalisation Process Theory (NPT). NPT encompasses the concepts of NPM as the Collective Action component of the theory, and this section goes on to explain how NPT, rather than NPM, was used to investigate the research question.

Table 2. Constructs of the Collective Action Component of Normalisation Process Theory

Interactional Workability (IW) IW refers to the impact that a new technology has on interactions, particularly the interactions between health professionals and patients.	Skill Set Workability (SSW) SSW refers to the fit between the new technology and existing skill sets. If a technology requires groups of professionals to work either above or below their current skill set (e.g. it requires a clinician to do clerical work or an administrator to make clinical decisions) it is unlikely to normalise.
Relational Integration (RI) RI refers to the impact of the new technology or practice on relations between different groups of professionals. A positive impact on RI is more likely if the technology does not disrupt current lines of responsibility and accountability.	Contextual Integration (CI) CI refers to the fit between the new technology and the overall organisational context. This includes the goals of the organisation, morale, leadership and resources.

Source: Murray et al 2011, p.3.

May, Mair et al (2009, p.540) explain that Normalisation Process theory is concerned with three core problems:

1. Implementation; the social organisation of bringing practices into action.
2. Embedding; the processes through which practices become (or do not become) routinely incorporated into the everyday work of individuals and groups.
3. Integration; the processes by which practices are reproduced or sustained in an organisation.

The starting point of Normalisation Process Theory is that in order to understand how a practice becomes embedded it is necessary to look at what people actually do and how they work. This focus on action is what distinguishes Normalisation Process Theory from theories such as Diffusion of Innovation Theory (Greenhalgh, Robert et al 2004) which seeks to explain how innovations

do or do not spread across organisations, or Actor Network Theory, which seeks to investigate how networks come into being and how actors are enrolled into those networks.

Actor Network Theory is useful for describing how things happen, and has been used to evaluate e-health systems, for example in the study of electronic health records in secondary care that formed part of the CfH Evaluation Programme (Robertson, Cresswell et al 2010). However, it is less useful for understanding why things occur (Creswell, Worth et al 2010). Other theories that have been used for evaluating e-health systems include Social Shaping of Technology (Williams and Edge 1996) and the Technology Acceptance Model (Legris, Ingham et al 2003; Yarborough and Smith 2007) which uses a linear regression model to predict the use of an IT system. The latter theories are not considered as relevant as Normalisation Process Theory to the thesis case study, as they are more suited to research questions that can be studied under controlled conditions.

Although Normalisation Process Theory has been developed through collaboration across a number of academic disciplines, it is a sociological theory as it focuses on the contribution of social action to implementation, embedding and integration. May, Mair et al (2009, p.5) describe it as a middle-range theory, using that term to mean that:

“The theory is sufficiently abstract to be applied to different spheres of social behaviour and structure, but does not offer a set of general laws about behaviour and structure at a societal level.”

In the seminal paper on NPT, May and Finch (2009) describe how the theory provides a set of tools to understand and explain the social processes that frame the implementation of material practices. In putting forward the theory they argue that:

- *Material practices become routinely embedded in social contexts as the result of people working, individually and collectively to implement them;*
- *The work of implementation is operationalised through four generative mechanisms:*
 - *Coherence*
 - *Cognitive participation*
 - *Collective action, and*
 - *Reflexive monitoring;*
- *The production and reproduction of a material practice requires continuous investment by agents in ensembles of action that carry forward in time and space. (p.540).*

The first NPT notion of Coherence is concerned with defining the component parts of a practice, and with how actors conceptualise and make sense of that

practice. In this context a practice might involve a set of beliefs, behaviours or actions, the practice depends on a set of ideas about its meaning and usefulness, which in turn make it possible to share that practice and get it embedded. The NPT notion of Coherence also involves a process of differentiation, where the new working practice is identified by its differences from other practices.

The second NPT notion of Cognitive Participation is concerned with defining and organising the people involved in any type of complex interaction. Before a new working practice, or new e-health system, can become embedded, it is necessary for actors to be enrolled in social networks and to work together to participate in that new working practice. It is also necessary for the actors concerned to become engaged in the process of change, and in interpreting how the new practice relates to shared beliefs or norms about what constitutes legitimate working practice.

The third NPT notion of Collective Action is concerned with the work that individuals and groups undertake in order that a new practice or system becomes embedded and forms part of everyday working practice. This notion relates to the collective action that involves investing effort to achieve a goal, which could include resistance as well as acceptance or compliance. The constructs of Collective Action are shown in Table 2.

The fourth NPT notion of Reflexive Monitoring is concerned with the ways in which the implementation of a new working practice is continuously evaluated by the participants, both formally and informally. The monitoring work may be undertaken in a structured way, for example by the host organisation using formal procedures to assess its impact, or it may be undertaken in a less systematic way by individual practitioners.

The constructs of NPT have been extensively tested by Murray, Burns et al (2011) through the use of case studies that have evaluated a number of e-health initiatives in acute, primary and community care settings.

The study by Murray, Burns et al focused on the collective action component of NPT to determine what happened and to obtain participants' views about why things happened. Participants were asked for a description of the implementation process from their perspective, for their views about factors that had promoted or limited the implementation, and for their assessment of how far the e-health system had become normalised and formed part of routine everyday working practice.

The case studies showed a wide range of normalisation. At one end of the spectrum, the PACS system was completely normalised and embedded into routine working practice, whereas the Community Nursing Information System was only partially normalised and provided a good example of the difference

between adoption and normalisation. Although 80% of the District Nursing staff reported using it, many of them were also still using paper based systems in parallel. The variability in normalisation was analysed using NPT as an explanatory framework, and it was found that where high levels of the collective action components were identified, high levels of normalisation had occurred.

Murray et al concluded that their case studies show that NPT provides a very useful framework for understanding the processes that affect the implementation, embedding and integration of new technologies in healthcare.

Although it is still a relatively new theory, NPT is becoming increasingly used as a lens for research in the field of health informatics. For example, Morrison and Mair (2011) have written about how NPT can help to bridge the gap between the potential of e-health systems to become integrated into everyday clinical practice, and Godden and King (2011) have reported on a research project which used NPT to investigate how telehealth had been used in the Highland Region of Scotland to support primary care respiratory medicine. The theory has also been used to investigate other aspects of health care such as patients' experience of the treatment burden from living with chronic heart failure (Gallagher et al 2011) and the implementation of nutrition guidelines in residential care homes (Bamford et al 2012).

Normalisation Process Theory is discussed further in section 5.6.

2.8 The NHS National Programme for IT

2.8.1 Creation of the National Programme for IT

In the NHS Health Informatics policy and practice for the last decade has been dominated by the National Programme for IT. Until the late 1990s decisions about investments in IT systems were taken at local level. This changed when the Department of Health published *Information for Health* (1998) which set out a vision to create joined-up IT systems that would be used across different care settings, and this was followed by the publication of *Delivering 21st century IT support for the NHS* (2002) which set out a national information strategy for the NHS and led to the creation in October 2002 of the NHS National Programme for IT.

2.8.2 Scope of the programme

According to the National Audit Office (2011) this was an £11.4 billion programme of investment. In broad terms the aim of the programme was to

support staff in all NHS organisations by giving them better access to patient information and support for their decision-making through a wide range of systems. As at November 2012 there were 40 services and applications listed on the CfH website.

The principal components of the programme were an electronic NHS care record, consisting of a nationally transferrable Summary Care Record and a more local Detailed Care Record; an electronic prescription service; an electronic booking service; Picture Archiving and Communication Systems (PACS); a national email service for NHS staff; and a national data network for the NHS. The subject of this case study, the Map of Medicine, was one of the applications provided as part of the National Programme for IT and is described in section 2.12.

The contractual arrangements for the National Programme for IT are worth noting, as these have a bearing on the study. For some elements of the Programme, such as the NHS Mail service, there was a contract with a single service provider covering all NHS organisations in England. To encourage competition between suppliers, the contracts for many components were divided between four Local Service Providers (LSPs) who were responsible for implementing systems at a local level. In the north of England the LSP was the Computer Sciences Corporation (CSC), and the contract for the provision of the Map of Medicine system was between CSC and the Map of Medicine company. There was no direct contractual relationship between local NHS organisations and the supplier of the Map of Medicine system.

2.8.3 Reviews of the National Programme for IT

The Programme has been the subject of a number of reviews. For example, the House of Commons Public Accounts Committee (2007, p.6) expressed concerns that *“the programme had focused too narrowly on the delivery of the IT systems at the expense of proper consideration of how best to use IT within a broader process of business change”*. Two years later the Public Accounts Committee (2009) stated that the Care Records Service was at least 4 years behind schedule, and pointed to the difficulties in convincing NHS staff of the benefits of the Programme because the functionality delivered to date had not met their expectations. A further Public Accounts Committee report (2011, p.3) was even more critical, stating that the Department of Health had *“failed to demonstrate the benefits achieved for the £2.7 billion spent to date on care records systems”*. The report criticised the Department of Health’s weak programme management and stated that some of the pitfalls could have been avoided if health professionals had been consulted at the start of the process.

The first National Audit Office report (2006) concluded that substantial progress had been made in successfully placing large contracts and securing large reductions in prices from bidders, but the second report from the NAO (2008) expressed concerns about whether significant benefits would be delivered by the Programme. A further NAO report published in 2011 focused on the Care Records System element of the Programme, and stated that although some care records systems were in place, the Department of Health:

“had not delivered systems with anything near the completeness of functionality that will enable it to achieve the original aspirations of the Programme. The Department has also significantly reduced the scope of the Programme without a proportionate reduction in costs” (p.13).

On that basis the NAO concluded that the £2.7 billion already spent on care records systems did not represent value for money.

As well as those formal reviews, the National Programme for IT has been the subject of several studies published in peer reviewed journals. For example, a qualitative study by Hendy et al (2005) of the implementation of the National Programme for IT in Acute Hospitals concluded that, although the technical and logistical challenges were considerable, those relating to issues such as organisational culture, clinical engagement and professional autonomy were equally daunting, and that an emphasis on short term benefits coupled with unrealistic timescales was unlikely to persuade NHS staff to adopt the Programme enthusiastically.

To put it in the wider context of NHS expenditure, Brennan (2007) observes that although the estimated cost of the Programme is large at £11.4 billion over 10 years, over that same period the NHS is expected to spend £3.3 billion on electricity and gas, £6.6 billion on transport and £42 billion on agency staff. Brennan notes that the NHS would still be spending less than 3% of turnover on IT, compared to 4-5% in local government and 6-7% in banking. Despite the valid criticisms about the technology led approach and lack of clinical engagement, he argued that there were some positive achievements, such as the N3 data network and the NHS Mail system.

In a review of the National Programme for IT, Cross (2011) describes some successful aspects of the Programme, such as the rapid implementation of PACS, but observes that these aspects have been overshadowed by the failure of the attempt to introduce centrally procured electronic records systems across secondary care. He suggests that the UK government's record with big IT projects is probably no worse than the record of private industry, but the latter is better at keeping disasters quiet.

A similarly nuanced view of the National Programme for IT is taken by De Lusigan and Krause (2010). They argue that the Programme should have been

called the National Pilot of Implementing Technology, and described it as a massive pilot of a largely untested approach to delivering IT to support healthcare at a national level. The authors describe a number of successes, (such as the NHS Number, PACS, and Pathology Links) as well as a number of failures (such as the Summary Care Record and Health Space).

2.8.4 The CfH Evaluation Programme

The Connecting for Health Evaluation Programme was set up to commission independent evaluation of specific elements of the National Programme for IT (University of Birmingham 2012). One of the most important outputs was a review of the impact of e-health on the quality and safety of healthcare by Black et al (2011). This involved a systematic review of the literature on systematic reviews about the various e-health technologies and their impact on quality and safety and included reviews about the use of Electronic Health Records, Picture Archiving and Communication Systems, Computerised Physician Order Entry Systems and computerised decision support systems.

Black and colleagues concluded that there are a number of landmark reports about quality and safety in healthcare, such as “*To err is human*” (Institute of Medicine 1999), which point to the potential of e-health to support improvements in healthcare. However, their main finding was that the empirical evidence for the beneficial impact of most types of e-health systems is at best rather modest, and in most cases absent. They found some important literature relating to the design and implementation of e-health systems which can help to explain why some e-health systems seem to succeed while others are deemed to have failed. At the individual level human factors play an important role in the design of systems and ultimately influence whether systems are adopted. At a more general level organisational issues are considered to be critical in choosing how to deploy systems, and that influences adoption. The authors refer to a paradox where the number of e-health systems being used is growing, while we still have relatively little understanding about how and why such interventions either do or do not work (Shepperd et al 2009).

Another important study was by Robertson et al (2010) who studied the implementation and adoption of electronic health records in secondary care. This was a mixed method, sociotechnical case study carried out at five NHS Trusts. The main findings were that the original top-down policy of standardised Care Records Service applications had evolved into an approach that was more responsive to local circumstances, and that delays were often due to unrealistic timescales that were politically driven. They concluded that the findings from their interviews were consistent with the fundamentally sociotechnical nature of electronic health records and the need to align technology with the people who are expected to work with it.

The other seminal work from the CfH Evaluation Programme was the study of the Summary Care Record. Greenhalgh, Stramer et al (2010a) undertook a mixed method case study of the adoption and non-adoption of a shared electronic care record. This study conceptualised the SCR programme as a complex and dynamic sociotechnical network, and identified five different worlds: political, clinical, technical, commercial and patients. The authors reported that differences in norms, values, priorities and expectations between those worlds accounted for the instability in the sociotechnical network, and explained many of the challenges that were observed in the implementation and evaluation of the SCR programme. The authors concluded that, despite the large investment of time and money, most front line clinicians simply did not use the SCR system.

The final report of the evaluation, *The Devil's in the Detail* (Greenhalgh, Stramer et al 2010b) challenged some of the mechanistic assumptions of the people who designed and managed the National Programme for IT, and drew attention to the deep cultural divide between the ways that the different stakeholder groups saw the Programme. Despite the conflicts that were observed, the authors concluded:

“Greatest progress appeared to be made when key stakeholders came together in uneasy dialogue, speaking each others’ languages imperfectly and trying to understand where others were coming from, even when the hoped-for consensus never materialised.” (p.21).

2.8.5 A postscript to the National Programme for IT

Although a new coalition government was elected in 2010, many elements of the NHS National Programme for IT were left in place. This has begun to change with the publication of a new information strategy for the NHS, *The Power of Information* (Department of Health 2012), which marks the end of nationally procured IT systems but still requires the NHS to make significant progress in its use of e-health systems. In subsequent interviews (BBC News 2013) the Secretary of State for Health has announced that he expects the NHS to provide the public with online access to their health records by 2015 and for the NHS to be paperless by 2018, claiming that this would save billions of pounds. However this political optimism is in marked contrast to the recent evaluation of the telehealth Whole Systems Demonstrator Programme (Cartwright et al 2013) which found no evidence that it improved the quality of life and psychological outcomes for patients with long-term conditions.

2.9 Evidence-based practice

Sackett et al (1996) define evidence-based practice as:

“The conscientious, judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.” (p.1).

Few people would question the desirability of promoting the concept of evidence-based practice in healthcare and this has been a recurring theme in the NHS. Policy documents, such as the Darzi Report (2008) and the White Paper *Equity and Excellence: Liberating the NHS* (Department of Health 2010b) emphasise the need to focus on the quality of care and on outcomes, and challenge the NHS to ensure that health professionals have access to the evidence base.

However, at a practical level, working practices often vary quite widely from what is recommended as best practice. In a paper about resisting evidence-based practice Pope (2003) uses a social movement perspective to illustrate why some clinicians resist. She presents data from a qualitative study of English and American surgeons to highlight how some practitioners draw a distinction between the science of formal guidelines and the art of everyday clinical practice. She reports how those surgeons deal with contingency, and how they describe their practice as being guided by hunches or “gut feeling”. She relates how their response to contingencies was based on exposure to concrete problems and contrasts this experientially learned practice with the formal knowledge base of clinical guidelines.

2.10 Getting research evidence into practice

History shows that achieving changes in professional practice is not a simple matter. Best and Neuhaser (2004) described how Ignaz Semmelweiss worked as an obstetrician in Vienna in the 1840s, and observed that women whose babies were delivered by doctors had a much higher mortality rate than those whose babies were delivered by midwives. He concluded that this was due to the fact that the physicians and medical students had been handling corpses during autopsies before attending the pregnant women. He initiated a mandatory hand washing policy for the physicians and medical students, and the mortality rate fell significantly. Although Semmelweiss was probably the first healthcare professional to demonstrate through experiments that hand washing could prevent infections, he was unable to persuade his colleagues to change their behaviour. It was almost 40 years after his experiment that his work was revisited, and hand washing became a widely accepted part of clinical practice.

A systematic review of interventions to improve practice undertaken by Oxman et al (1995) looked at 102 trials that were aimed at improving the performance of health professionals and concluded that dissemination strategies, such as conferences or unsolicited mailing, showed little or no changes in the behaviour of health professionals. The authors drew an analogy between trials of interventions to alter the performance of health professionals and drug trials:

“There are no wonder drugs; often several medications are needed to effect clinically important changes in health status. It is the same with the alteration of health professional performance: many interventions have negligible effects when used alone. However, when coupled with other strategies the effects may be cumulative and significant.” (p.1427).

This is consistent with the work by Marteau et al (1998) on getting research findings into practice that provides a critique of the information deficit model, which assumes that providing new knowledge will produce new behaviour. Marteau et al argue that, while information may be necessary for behavioural change, on its own it is rarely sufficient. They suggest that rather than expecting individuals to be sitting passively waiting to be changed, we should consider a more complex social cognition model where, before changing their behaviour, the individual will consider if the change is worthwhile and what others will think about it. A similar concern is expressed by Green (2008) who refers to the “empty vessel” fallacy. This assumes that information should be pushed out to healthcare practitioners who will passively receive it and, once the vessel is full, the recipient will spill over into action.

A systematic review by Greenhalgh, Robert et al (2004) looked at the diffusion of innovation in service organisations. They examined almost 500 studies and found three main conceptual bases for the spread of innovation as set out in the following table, each of which had a number of defining features and assumed mechanisms.

Table 3. Conceptual bases for the spread of innovation

Let it happen	Help it happen	Make it happen
<i>Defining features</i>		
Unpredictable, unprogrammed, adaptive	Negotiated, influenced, enabled	Scientific, orderly, planned, regulated
<i>Assumed mechanism</i>		
Natural, emergent	Social	Managerial
<i>Metaphor for spread</i>		
Emergence, adaptation	Diffusion, negotiation	Dissemination, re-engineering

The authors concluded that there were certain attributes that explain the variability in the adoption of innovations. These included relative advantage (innovations with a clear advantage in effectiveness are more easily adopted); compatibility (innovations that are compatible with the intended adopter's values and norms are more readily adopted); and complexity (innovations that are perceived by key players as simple to use are more easily adopted).

It is widely recognised that, even in the age of the internet, it can take a long time to change the behaviour of healthcare professionals. Balas and Boren (2000) reviewed the publication of a number of landmark clinical trials and concluded that it typically took 16 years to reach a rate of use of 50%, whilst Green (2008) reviewed the reasons for the gap between research and practice, and cited a frequently quoted statement that *"it takes 17 years to turn 14 per cent of original research to the benefit of patient care"*.

More recently Yuan et al (2010) published a blueprint for the dissemination of evidence-based practice in health and cite a review of the literature that suggests that it takes an average of nine years for interventions that are recommended as evidence-based practice in systematic reviews to be fully implemented. They comment that an S-shaped rate of adoption is typically observed, with a relatively slow initial rate of diffusion, which speeds up as a critical mass takes on the innovation and finally levels off as the number of individuals who have not yet adopted the innovation reduces.

2.11 Information overload

The risk of information overload is now widely recognised. Since Gutenberg invented movable type there has been a steady increase in the availability of printed reading matter, and the advent of digital technologies has exacerbated the situation. Hibble et al (1998) reported a review of clinical guidelines received by General Practices in the Cambridgeshire area. They found that each year a typical GP received a mass of paper about two feet high, that the guidelines were in an unmanageable form, and that the documents did little to aid decision-making.

Several years ago it was estimated by Sackett et al (1996) that a Physician would need to read 17 articles a day, 365 days a year to keep up to date with the current evidence, whilst Balas and Boren (2000) calculated that the number of articles indexed annually in the Medline database had doubled over the previous 20 years. It is estimated that there are now over 25,000 journals currently in print in medicine, science and technology, that those journals published 1.5 million articles in 2009, and that the Pub Med database alone now cites more than 20 million articles.

Commenting on the impossibility of being an expert, Fraser and Dunstan (2010) have estimated that, even in a fairly narrow specialty, it is impossible to keep up with all of the material published in peer-reviewed journals. Taking cardiac imaging as an example, they estimated that a new entrant would need to read 40 papers a day, 5 days a week for 11 years to get themselves up to speed with the published evidence. Unfortunately, by the time that task was finished, a further 82,000 articles would have been published, which would take another 8 years to read.

Fava and Guidi (2007) have studied the impact of information overload on clinicians and suggest that there is evidence that the quality of decision-making varies with the amount of information that a person receives, up to a certain point, but beyond that point performance is likely to decline due to confusion, inability to set priorities and difficulty in recalling previous information.

Smith (2010) argues that it makes no sense for doctors to even try to read everything that is published in their field, and states that one of the most widely accepted responses to information overload is to rely on critical summaries of the evidence such as those published by the Cochrane Collaboration. However, a review by Bastian et al (2010) found that around 75 clinical trials and 11 systematic reviews are published every day, but despite this there are still many clinical topics that have no Cochrane systematic review.

2.12 The Map of Medicine

An important element of the NHS approach to providing access to evidence-based information, whilst dealing with the risk of information overload, is the *Map of Medicine* (Map of Medicine 2012). It is described by the system suppliers as “*a collection of evidence-based, practice-informed care maps which connect all the knowledge and services around a clinical condition*”.

The concept of the Map of Medicine was originally developed by clinicians in the Royal Free Hospital in London. At that time the NHS was subject to a government drive to reduce waiting lists, and many of the specialists in the hospital were concerned about the number of referrals received from General Practitioners. Some hospital clinicians felt that a number of these referrals were inappropriate and that specialist knowledge should be made available to all clinicians to improve the quality of referrals from primary to secondary care. This led to the development of the earliest version of the Map of Medicine, as a tool to make specialist knowledge available to clinicians and to mediate a dialogue between clinicians working in different care settings.

The Map of Medicine software presents evidence-based pathways in a visual format, and covers around 400 care pathways across medical and surgical specialties. An example of one of the pathways is shown in Figure 1. The pathways are presented as a series of nodes, and the user can click on any given node to see the evidence it is based on, for example a hyperlink to a guideline published by NICE or a paper published in the BMJ. The pathways published by the Map of Medicine are national pathways, but the system allows for the pathways to be customised to reflect local circumstances. The system has been made available to users across the NHS in England under the umbrella of the NHS National Programme for IT (NHS Connecting for Health 2013). In spite of the investment that has been made by the Department of Health in funding the cost of the software licences and the costs of deployment and training, there was no published evidence about whether NHS staff actually used the system apart from one study by Brennan and Mattick (2010).

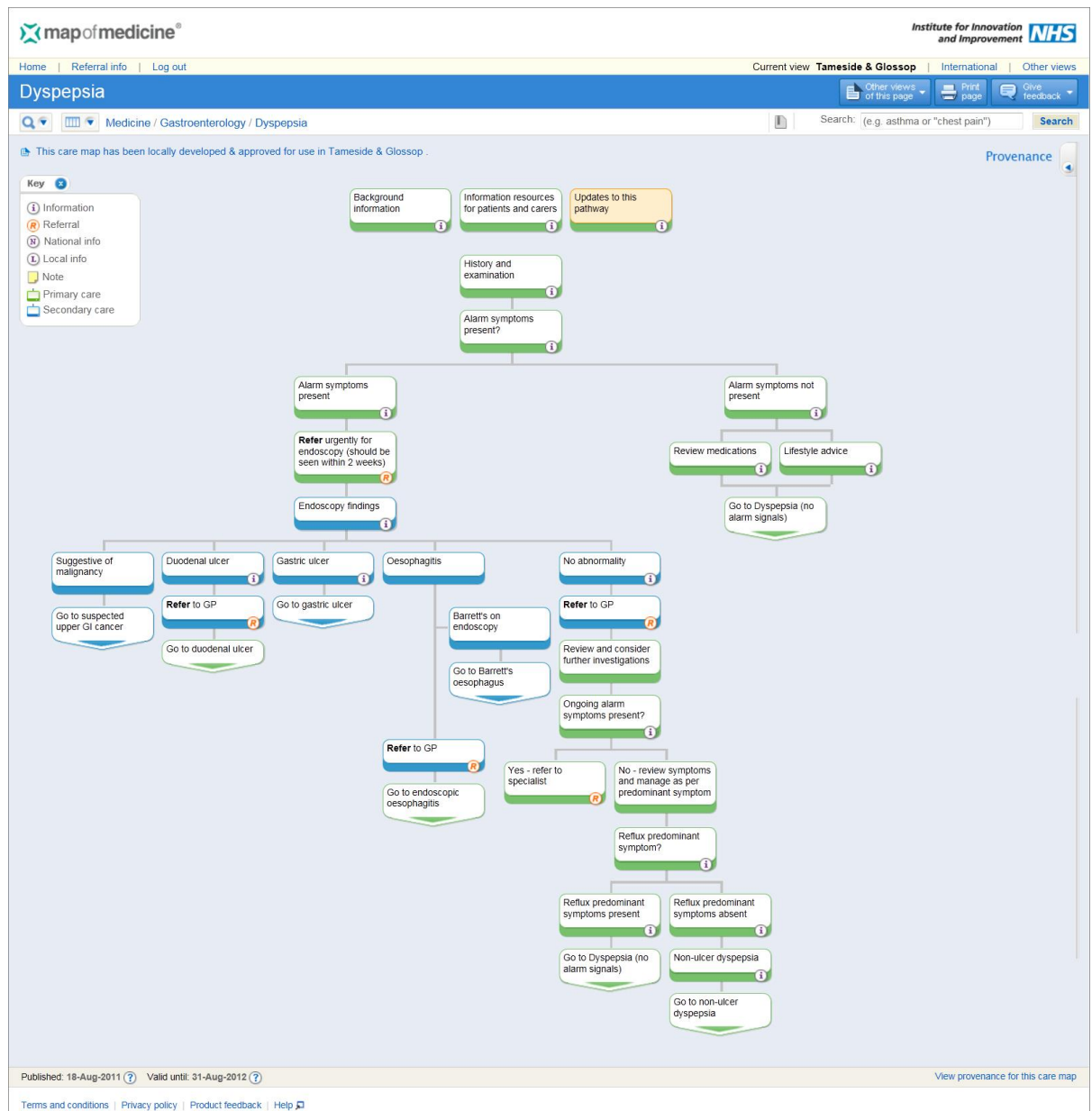
The theoretical advantages of the Map of Medicine have been articulated by Gray (2011) in his review of how to build healthcare systems. He argues that by having the system accessible from the World Wide Web, long complex documents can be summarised as a series of steps along a care pathway, that the system can help to bridge the barriers that often exist between primary and secondary care services and the practitioners working in those settings, and the national pathways can be customised or amended to reflect the particular needs of a local patient population.

A systematic review of the published literature on the impact of the Map of Medicine on healthcare has been published (Brennan et al 2011). The authors reported that, although the system had also been procured by government agencies in England, Wales, Sweden and Denmark, apart from material published by the system supplier there was very little evidence about the impact of the system on clinical practice.

The only relevant paper published in a peer-reviewed journal was by Phillips et al (2009) which reviewed the Map of Medicine in the context of the renal quality outcomes framework and the impact on secondary care. The study examined the quality of referrals and categorised them as appropriate, inappropriate or with inadequate information. The authors reported that the launch of the Nephrology pathway on the Map of Medicine resulted in a reduction in the number of letters with inadequate information, as well as a fall in the total number of referral letters received. The authors also stated that referrals from General Practices registered as users of the Map of Medicine were more likely to be appropriate and less likely to contain inadequate clinical information than those who were not registered users. This inference is open to question, as it is not clear whether practices that were registered with the Map of Medicine actually used it to inform decisions about whether to refer those patients. In addition, although the paper does not provide actual numbers, visual inspection of the graphs provided indicates that approximately 45% of patients referred by

practices not registered with the Map were seen and followed up compared to 60% referred by practices registered with the Map. This is unlikely to be a statistically significant difference, although the authors do not comment on this.

Figure 1. An example care pathway from the Map of Medicine



Although the Map of Medicine was originally developed as a means of providing access to the evidence base for health professionals, more recently it has been promoted as a tool to assist in tackling the economic challenges faced by the

NHS, by enabling commissioners to design care pathways to make them more cost effective. A Cochrane Review by Rotter et al (2010) examined data from studies in eight countries and found a statistically significant reduction in inpatient complications associated with the introduction of care pathways. They also report that hospital lengths of stay and hospital costs were significantly reduced in several of those studies, and that the reduction was associated with the use of care pathways.

2.13 Summary

There is good evidence that e-health systems have the potential to make a significant difference to the outcomes of patient care. However, the literature suggests that many IT systems fail to meet their stated goals, mainly due to a failure to take account of the social and organisational factors involved in the implementation of such systems.

This thesis focuses on one particular e-health system, the Map of Medicine, which has been made available to all NHS organisations in England as part of the National Programme for IT, in order to provide access to evidence-based information.

At the start of the project very little was known about whether or not the system was actually used by health professionals. The research project is aimed at exploring and understanding how the Map of Medicine has been implemented in primary and community care settings.

A number of approaches used to evaluate e-health systems and theoretical frameworks have been discussed. It is considered that Normalisation Process Theory is the most suitable framework for this study as, unlike some other frameworks, the concepts of NPT are particularly well suited to gaining insights into how and why e-health systems do, or do not, become part of everyday working practice.

The methods used in the study are described in the following chapter.

Chapter 3 - Methods

“The pure and simple truth is rarely pure and never simple” Oscar Wilde.
(The Importance of Being Earnest 1895, cited by Wikiquote 2013b).

3.1 Introduction

The previous chapter reviewed the literature on the potential contribution that e-health systems can make to healthcare, the reasons why that potential is often not fulfilled, and considered a number of different approaches that have been taken to evaluate e-health systems.

This chapter describes the aims and the research design for the study. It provides a critical review of the methodological approaches that were considered, and explains why a mixed methods case study approach was selected as the preferred approach for this particular research question.

3.2 Aim and objectives of the research

The overall aim of the research is to describe and explain how one particular e-health system, the Map of Medicine, has been implemented in primary and community care settings.

The objectives of the research project are:

1. to assess the level of awareness about the Map of Medicine in primary and community care settings, and to investigate the current level of use in the study population;
2. to explore and explain the reasons for the variability in the use of the Map of Medicine in the study population, and to identify the enhancers and barriers to the adoption of the system;
3. to explore whether the Map of Medicine was used during patient consultations and outside consultations, and to assess the impact it had on the consultation;
4. to explore and describe how use of the Map of Medicine at micro level has been influenced by factors at the meso and macro level;

5. to identify the lessons that can be learned about the barriers to the implementation of e-health systems.

3.3 Theoretical frameworks

The theoretical framework used in this study is based on the sociotechnical approach as proposed by Peltu et al (2008), Clegg (2009) and Greenhalgh, Stramer et al (2010a), as described in section 2.6.2.

A similar perspective is offered by Harrison et al (2007) who have reviewed the unintended consequences of the introduction of information technology in healthcare. They state that there is a common misconception that problems with implementing e-health systems can be solved with more or better technology, and that implementation depends primarily on training and technical support. They argue that these mechanistic assumptions should be rejected and replaced with a sociotechnical approach.

Kaplan (1997) has criticised traditional approaches to the evaluation of e-health systems which have been conducted using an experimental or clinical trials model, and which have focused on the technical or economic factors that are believed to affect the performance of those systems. Kaplan describes a variance approach, where experimental studies attempt to determine the relationship between predefined variables such as completeness, accuracy and IT system response times. These research designs can be criticised for failing to get to grips with the social settings in which those e-health systems are introduced and are adopted, or are often resisted and ignored. Kaplan highlighted the need to take organisational issues into account when evaluating e-health systems, and proposes the use of quantitative and qualitative methods to allow for a focus on the complex interaction of technological, organisational and behavioural issues.

Similarly Greenhalgh and Swinglehurst (2011) have suggested that the use of technology in healthcare should be studied as social practice. They argue that, although experimental studies have their place in health informatics research, the limitations of those approaches are becoming more widely recognised. They state that such approaches have severe limitations when attempting to study the adoption, or lack of adoption, of e-health systems in the real world of clinical practice which is messy, heterogeneous and difficult to classify.

As discussed in the previous chapter, Normalisation Process Theory is considered to be the most suitable theoretical framework for this particular research question, as it was specifically designed to help understand how practices become embedded and integrated into their social context. In the real

life situations covered by the research question there are tensions and paradoxes, power relationships and competing interests between the key stakeholders. A sociotechnical approach is deemed to be suited to the research question as it provides a framework for considering those issues and for explaining the adoption, or non-adoption of the e-health system in one particular locality. The following sections explain the research methods that have been chosen, and the reasons why those methods are considered appropriate for this particular research question.

3.4 Case study approach

Yin (1999) argues that the approach is useful for studying complex systems in a state of flux and exploring how and why particular outcomes occurred rather than just describing what happened. He states that *“the all-encompassing feature of a case study is its intense focus on a single phenomenon within its real-life context.”* (p.1211).

Similarly, Anthony and Jack (2009) argue that case study methods are suitable for exploring a phenomenon in its real life context, and Crowe, Cresswell et al (2011) argue that a case study approach is appropriate when there is a need to explore a phenomenon in its natural context, and that the approach is particularly useful for capturing information about how a given intervention is being implemented and being received by the target audience. They argue that the approach can provide insights into why one way of implementing a new system might be selected in preference to another.

According to Baxter and Jack (2008), a case study design is suitable when the focus of the study is to answer “how” and “why” questions, when the researcher cannot manipulate the behaviour of those involved in the study, and when it is important to cover contextual conditions because it is likely that they are relevant to the phenomenon being studied.

The research question involves the study of the implementation of an e-health system in real life settings rather than under laboratory conditions, and seeks to understand how and why the system was, or was not adopted by health professionals. A case study design is therefore considered to be particularly suited to this particular research question, and it is felt that Normalisation Process Theory provides a suitable lens for studying how implementation occurs by bringing practices into action, how and why those processes become (or do not become) embedded into the everyday work of individuals and groups, and how and why those practices may become integrated and sustained.

Baxter and Jack describe the philosophical underpinnings of a case study approach as being based on a constructivist paradigm that recognises that truth is relative, depends on one's perspective and is built on the premise of a social construction of reality. With this project, the implementation of the e-health system has involved a set of complex processes that will continue to evolve over time. A case study approach is therefore considered to be appropriate to answer the research question.

A hallmark of case study research is the use of multiple data sources, and this case study design is based in part on the approach put forward by Eisenhardt (1989) who recommends multiple methods of data collection from a variety of sources, with data analysis overlapping with data collection. Yin (1999) cautions against relying on a single data collection technique such as a site visit and advises that a wide variety of techniques should be used. Crowe, Cresswell et al (2011) also argue that a case study approach will typically involve the collection of data from multiple sources and will often involve a range of quantitative techniques such as questionnaires and the analysis of routinely collected data, as well as qualitative techniques such as interviews. The use of multiple data sources is a common feature of case studies as it enables the researcher to triangulate the data. Approaching the chosen topic from several angles can also enable the researcher to develop a more holistic view than would be possible if a single method of data collection was used.

It is necessary to determine the unit of analysis for the case study, and for this project the case unit was the NHS primary and community care settings within one Primary Care Trust in the north of England. Although the research design is based on a single case, the project has involved analysis at sub-unit level within the larger case. Findings are therefore presented on the use of the e-health system in General Practice settings, and in Community healthcare settings.

Baxter and Jack (2008) define a number of different types of case study, the main variants being exploratory and explanatory. An exploratory case study is appropriate when little is known in advance about the phenomenon under study, whilst an explanatory case study is suitable for answering a research question where there are presumed causal links, but the real life interventions are too complex for an experimental strategy. Prior to the project, little was known about whether healthcare professionals actually used the e-health system in question, although it was anticipated that the themes that would emerge would include power, professional autonomy and organisational culture. The research design for this project therefore has elements of both of those approaches. It is recognised that a case study approach does have certain limitations, and these are discussed in section 6.3.

3.5 The research design

The overall design of the research project is based on the sociotechnical approach as outlined in section 2.6.2, which requires consideration of how systems are introduced and become part of social practice. The approach emphasises the importance of working practices, job role and culture, and recognises that clinical work is complex and associated with uncertainty and unpredictability. Although the research project had three phases they did not proceed in a linear fashion and there was overlap between the phases, as some of the initial findings led to further questions being followed up with research participants.

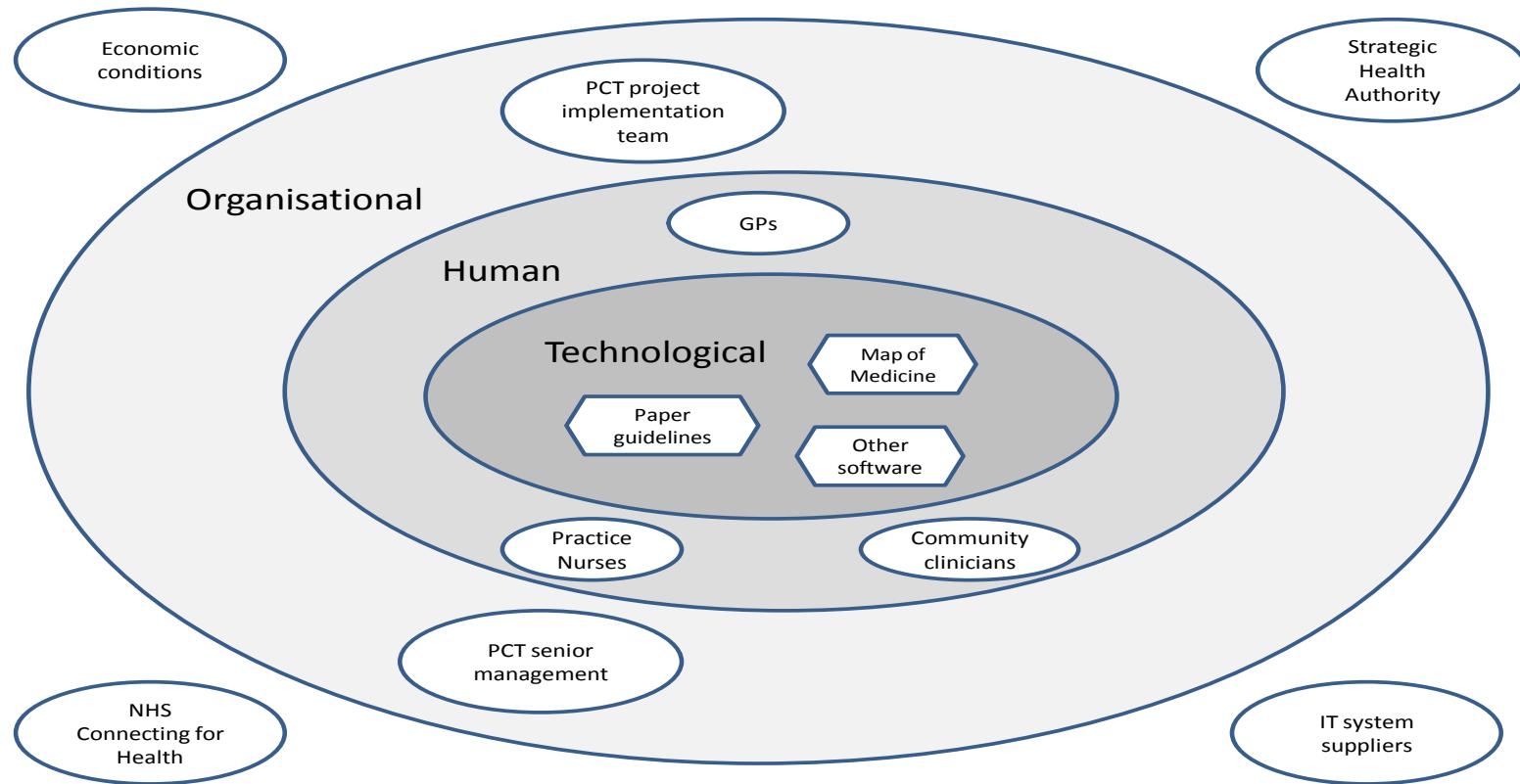
The project involved the collection of data at macro, meso and micro level. The sections which follow explain the data sources, and the links between those data sources and the project objectives.

The research design was based, in part, on the sociotechnical approach used by Greenhalgh, Stramer et al (2010a) in their evaluation of the NHS Summary Care Record. Figure 2 presents a simplified version of the network showing the macro, meso and micro contexts for the implementation of the Map of Medicine. The diagram aims to show how the decision by the Department of Health to implement the Map of Medicine as a component part of the of the NHS National Programme for IT was influenced at the macro level by NHS Connecting for Health and by the respective Strategic Health Authorities. At the meso level, responsibility for implementation was assigned to local Primary Care Trusts. Finally, at the micro level are the people who were expected to use the Map of Medicine in their day to day work. The identification of those levels requires some consideration of the debate about structure and agency, and this is discussed in section 5.3.2.

The first phase was focused on the macro and meso levels, and involved interviews with NHS senior managers working for bodies such as NHS Connecting for Health, Strategic Health Authorities, and the organisation responsible for implementing the NHS National Programme for IT across several PCTs in the north of England. This phase also included interviews with staff from the supplier of the e-health system. As well as conducting interviews, it involved the collection and analysis of a number of documents which were used to inform the later phases.

The second phase involved the use of an online questionnaire which was sent to all GPs and all Community healthcare staff within one Primary Care Trust. The results of this phase were used to inform the design of phase three in terms of the topics to include in the interview guide.

Figure 2. Simplified network showing the context for the implementation of the Map of Medicine



The third phase involved semi-structured interviews with a sample of GPs and Community healthcare staff within the area covered by a single Primary Care Trust. Semi-structured interviews were felt to be more appropriate than structured interviews, as this allowed for topics to be explored in more depth, depending on the responses given by individual research participants. Some consideration was given to the use of Focus Groups to collect the data for this phase, but this was rejected on the grounds that it would be more appropriate to talk to people individually about the use of e-health systems in their everyday work. It was also felt that having other people present might deter some participants from saying what they really felt about the system.

This research design, using a quantitative survey followed by qualitative interviews, enables the researcher to carry out a more detailed investigation of the phenomena being studied than would be gained through the use of just one method of data collection. Combining quantitative and qualitative approaches is often known as mixed methods research, and has been defined by Tashakkori and Cresswell (2007) as:

“Research in which the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of inquiry.” (p.4).

For many years the relative strengths and weaknesses of quantitative, positivist approaches and qualitative, constructivist approaches have been debated. Feilzer (2010) argues that mixed methods research offers a way around those debates about the relative merits of the paradigms, with its pragmatic view that either paradigm should be used where it offers a best fit. She also states that mixed methods are especially suited to studying problems in workplace settings, as opposed to studying them under controlled conditions. A mixed methods approach is considered to be the best fit for this particular research question as there was very little known about the Map of Medicine prior to the start of the project, and the combination of methods would enable the researcher to collect data from a number of sources using both quantitative and qualitative approaches, to triangulate that data and to develop a rich picture of the phenomena of interest.

There is evidence of a growth in the use of mixed methods research methods in health services research. O’Cathain et al (2007) undertook a survey of the use of mixed methods and found that researchers have pointed to the complexity of healthcare and the need for a range of methodologies to understand and evaluate those complexities. In their review they found that the reasons for using mixed methods usually related to a pragmatic need to engage with the real world and with complex issues, rather than from any ideological stance about paradigms. In this study it was necessary to take a pragmatic approach in order to balance the requirements of academic research on the one hand with the practical difficulties of gaining access to busy clinicians and NHS senior managers, for whom the research was a low priority.

3.6 Phase one: macro and meso levels

At the design stage of the project it became clear that this study spanned a number of different perspectives: management, clinical, technical, system suppliers and the front line NHS staff who were the intended users of the Map of Medicine. The first phase of the project was focused on the meso and macro levels and involved interviews with key staff from a number of organisations.

The recruitment of participants for this phase was based on a snowball sampling approach (Bryman 2008, p.184). Initially, contact was made with very senior managers in the local SHA who had written to all PCTs about the implementation of the Map of Medicine. Interviews were held with those senior managers, and they then suggested potential interviewees working at national policy level in the NHS, who in turn suggested potential interviewees in SHAs and PCTs in other parts of England. This snowball sampling approach was not intended to achieve a sample that was representative in a statistical sense, but it did enable the researcher to make contact with a number of potential participants who were involved in the implementation of the system at both national and regional level.

This phase involved a total of 13 interviews and included:

- senior staff from NHS Connecting for Health, the national body with overall responsibility for the NHS National Programme for IT;
- senior health informatics staff from three different SHAs;
- the Programme Director for the NHS National Programme for IT Programme Office for one part of the north of England;
- the Project Managers responsible for implementing the Map of Medicine in three local health communities;
- senior staff from the company that supplies the Map of Medicine system to the NHS.

An interview guide was developed for the meso and macro level interviews, and was adapted depending on the context of the interview. An example of the guide is presented in Appendix 7. A range of approaches were used for the interviews in this phase. The majority of the interviews were conducted face-to-face at the participant's workplace, and for most of those the interview was recorded for later transcription. However, some of the participants declined the request for the interview to be recorded. In those instances notes were made of the interview, a copy was sent to the participant, and they were asked to confirm if the notes were a correct record. None of the participants asked for the notes to be amended.

Some of the respondents agreed to be interviewed but requested that this was by telephone rather than face to face, and in a few cases the participant requested that another colleague should be present. The telephone interviews tended to be shorter and less in depth than the face to face interviews, and this is considered further in section 6.4.

In all cases, the participants were provided with a copy of the Participant Information Sheet and they were asked to sign the consent form.

As well as conducting interviews, this phase of the project involved the collation and analysis of approximately 50 documents relating to the Map of Medicine. Many of these are not cited in the References section as they were internal NHS documents which were not in the public domain, and citation might reveal the location of the case study. Those documents included business cases, programme plans, project briefs, project initiation documents, project plans, job descriptions, agendas and minutes from meetings, case studies and other reports. The documents were not subject to a formal content analysis, but they were treated as a source of data that was complementary to the interviews, and they were used to develop an understanding of the context surrounding the implementation of the Map of Medicine, and the review of those documents informed the development of the interview schedules. For example the business case for the implementation of the Map of Medicine in the NHS in Wales (Informing Healthcare 2008) described how the system was expected to support a number of health policy objectives. It also set out specific benefits that the system was expected to deliver, and this informed topics 2 and 5 in the interview guide (see Appendix 7). In a similar manner, topics 4 and 5 in the interview guide were informed by the Care Pathways Knowledge Management Programme Plan that had been published by one of the SHAs (Hindle-Smith 2008).

Further comments on the availability of certain documents and the willingness of key stakeholders to be interviewed are included in section 4.6.2.

3.7 Phase two: quantitative survey of NHS staff in primary and community care settings

This section describes the study population for this phase of the project, the sampling strategy, and how the data were collected and analysed.

The study population for this phase was all of the GPs and all Community healthcare staff working in one Primary Care Trust in the north of England.

3.7.1 The survey questions

At the outset of the project, despite that fact that the Map of Medicine had been implemented in the opinion of local NHS senior management, nothing was known about the actual level of use by NHS staff in primary and community care settings.

A questionnaire was designed in order to address objective 1, which was to assess the level of awareness about the Map of Medicine and to investigate the level of use in the study population. The survey included questions about what sources of online information about evidence-based practice, other than the Map of Medicine, were used. Respondents who did not use the Map of Medicine at all were invited to give the reasons why. It was recognised that there was a high risk that busy clinicians would not respond, so the questionnaire was designed to make it possible to complete in no more than five minutes. The order of questions was taken into account, so that any potentially contentious topics were left to the end. For relevant questions, a free text box was included next to the “Other” category, to make allowance for the possibility that the choices listed did not apply.

To encourage a higher response rate, it was decided to make the survey anonymous, but respondents were invited to give their email address or a contact phone number if they were willing to be contacted about the following phase of the study. A copy of the questionnaire is included in Appendix 3.

3.7.2 Validity

There are several types of validity. For example, Bryman (2008, p.150) defines face validity as being concerned with whether the instrument being used reflects the concept that is the focus of attention, whilst Bowling (2007, p.151) defines construct validity as corroboration that the instrument is measuring the underlying concept it purports to measure.

Bryman recommends using those with experience in the field to act as judges of face validity. In the case study the online questionnaire was pilot tested. The people chosen to pilot the questionnaire were chosen because they were experienced in their respective fields of work, had expressed an interest in promoting local research projects, and were known to the researcher.

The purpose of piloting a questionnaire (Bryman 2008) is to help to identify whether questions are clearly worded, given that when an online questionnaire is used the researcher will not be there to explain any ambiguity. It can also help to check if the ordering of questions is appropriate. In this research study the aim of the piloting was to make sure that the terminology used was appropriate for the target audience, and to ensure that the questionnaire could be completed within a few minutes. The people involved in the pilot test were also asked for their views on the relative merits of an online method of data collection, as opposed to a paper copy of the survey.

The feedback from the people involved in the pilot test was that the questionnaire was very straightforward. Some minor changes were suggested to the wording of the questions and these were adopted. All of those involved in the pilot test considered that an online survey was likely to produce a higher response rate than a paper version of the questionnaire.

3.7.3 Data collection and data management

The distribution of the questionnaire to GPs was arranged through the Medical Director, and the distribution to Community Health services staff was arranged through the Director of Community Health Services of the relevant Primary Care Trust. Each of those people had access to an email mailing list which was considered to be the most complete and up to date list of people in the respective study populations.

The email to staff contained a covering letter from either the PCT Medical Director or the Director of Community Health services, which explained the background and aims of the research project and encouraged the recipient to complete the questionnaire. The covering letter included a hyperlink to the questionnaire on the Survey Monkey website.

In an attempt to reduce the risk of a very low response rate, a reminder email was sent out by the PCT Medical Director and the Director of Community Health services respectively, two weeks after the first letter with the hyperlink to the questionnaire had been sent out. As the questionnaire was anonymous, it was not possible to just target non-responders, so the reminder was sent to all of the study population.

This part of the fieldwork took place during February and March 2012, a period when the NHS in England was going through significant organisational change. As a result of the Health and Social Care Act 2012, Primary Care Trusts were to be abolished and replaced by Clinical Commissioning Groups. These changes meant that many GPs were taking on additional roles as commissioners of local health services, and they were regularly receiving requests to complete questionnaires relating to changes in the local services.

The response rate for GPs was 33% (45 out of 137). No further reminders were issued as it was felt that this might be counter-productive, given that some of the study population would be contacted for the qualitative phase of the study.

The response rate after the first letter was lower for Community healthcare staff than for GPs. Following discussion with the Director of Community Health services, a reminder email was sent to Community staff which stated that if staff completed the online questionnaire and gave their email address they would be entered in a prize draw to win a box of chocolates or bunch of flowers. The reminder email had a noticeable impact, and the response rate for Community healthcare clinicians reached 32% (220 out of 687).

As the data were collected via an online questionnaire that was developed using Survey Monkey, there was no need for the intermediate stage required when using a paper-based questionnaire of entering the data into a computer for later analysis. This removed the need for data transcription and also reduced the likelihood of

errors in data entry, since the responses were as selected by the research participants.

3.7.4 Data analysis

For the analysis of the questionnaire, the data were imported from Survey Monkey into Microsoft Excel. This permitted the data to be reviewed and made it relatively simple to calculate basic descriptive statistics such as univariate frequency analysis.

For those questions that included an “other” category, for example in response to the question about online sources of information that were used, the free text responses were reviewed to allow a judgement to be made about whether to recode the data.

3.8 Phase three: semi-structured interviews with NHS staff in primary and community care settings

This section describes the methods used for the main qualitative phase of the project, which involved interviews with NHS staff working in primary and community care settings. It explains how the participants were recruited, the interview guides that were used, how the interviews were undertaken, and the key characteristics of the interview participants.

3.8.1 Semi-structured interviews

Semi-structured interviews were used for this phase and were considered to be more appropriate than unstructured interviews. This is because previous research on e-health systems using a sociotechnical approach provided an initial indication of the topics that should be covered in order to address objectives 2, 3 and 4.

The use of interviews was considered to offer some significant advantages to the research design. As Greenhalgh, Russell et al (2005, p.444) have observed, interviews offer a number of unique advantages such as:

- *Stories are told subjectively from the perspective of the narrator;*
- *Stories are non-linear, and convey multiple truths;*
- *Stories are embedded in a context. For example a story about what happened is nested within an overarching narrative of “what goes on around here”;*
- *Stories bridge the gap between the formal codified space of an organisation (job descriptions and lines of accountability) and informal uncoded space (relationships, feelings and unwritten rules).*

Greenhalgh et al note that this type of research should not be equated with privileging the judgement of the researcher over that of the research participant, and that the validity of the research relies on evidence of the researcher's reflexive awareness.

3.8.2 Potential interview participants

The interview participants were drawn from the study population, namely all of the General Practitioners and all Community healthcare staff working in one Primary Care Trust. At the design stage of the study it was recognised that there was a significant risk that clinicians working in primary and community care settings might be unwilling to participate in interviews. This was anticipated due to the time pressures faced by those staff, and was exacerbated by the demands on their time caused by the reorganisation of the NHS in England that was taking place during the period covered by the fieldwork.

3.8.3 Validity and rigour

Although it is generally accepted that qualitative methods are suitable for the evaluation of e-health programmes (Greenhalgh and Russell 2010, Mair et al 2012), it is important to take appropriate steps to demonstrate rigour. Mays and Pope (2000) argue that there are a number of ways in which the validity of qualitative research can be demonstrated. They argue that a clear explanation of the process of data collection and analysis is important, to allow the reader to form an opinion on whether the interpretation of the findings is supported by the data. They also argue that reflexivity is important, to demonstrate that the researcher is sensitive to how their prior assumptions and experience have shaped the research process. In addition, they state that it is important to consider the effects of the researcher's personal characteristics such as age, gender and professional background on the data collected and the relationship with the research participants.

Barbour (2001) suggests that a purposive sampling approach should be used where the researcher actively seeks to include the sorts of deviant cases that are typically excluded as outliers when following a quantitative approach. In response to the accusation of subjectivity that can be made about qualitative data analysis, Barbour suggests that multiple coding should be undertaken. She states that while it may not be practical to do multiple coding of entire data sets, it is useful to get a second researcher to review sections of data and coding frameworks, as they evolve during the analytical process. In a similar vein, Seale and Silverman (1999) suggest the use of a systematic coding scheme to enable the analysis of deviant cases, and to help counter the accusation of subjectivity.

Both Barbour (2001) and Halcomb and Andrew (2005) suggest triangulation as a way of improving rigour, although Barbour warns that triangulation can be difficult to perform as the data collected by different methods tends to come in different forms and may not lend itself to comparison.

The approach to sampling and inclusion of deviant cases is described in section 3.8.6, and the coding scheme is set out in section 3.8.7. In addition the ways in which other issues of validity and rigour were addressed, (such as reflexivity and getting a second researcher to review the coding frameworks and data analysis), are discussed in sections 6.3 and 6.4.

3.8.4 Interview guide

A guide was drawn up for the interviews with GPs and Community healthcare staff and a copy is provided in Appendix 8. The interviews were semi-structured, so there were some common elements to the interviews, but the approach allowed for flexibility during the interview when the researcher felt it was appropriate to probe.

The guide starts with simple questions, such as the size of the practice population, before proceeding to topics such as the participants' use of online systems to support their evidence-based practice, and the impact of those systems on their everyday working practice and on relationships with other health professionals.

The topics in the interview guide were developed from the literature review and some of the free text comments contained in responses to the online survey.

3.8.5 Data collection and transcription

For this phase of the study, data was collected by undertaking semi-structured interviews with GPs and with Community healthcare staff. In each case the research participant was asked to give their explicit consent to take part and to sign a consent form before the interview started. In this phase all participants agreed to the interview being recorded.

The interviews with GPs and with Community healthcare staff were held between March and September 2012. The interviews varied in length from 38 to 70 minutes, with the majority lasting between 45 minutes and one hour.

Following each interview, the recording was uploaded to a computer that was connected to a secure NHS data network. The interviews were checked to ensure that the recording was audible, and then the original recording was deleted from the digital recording device. The interviews were all stored on a secure area of that data network which was password protected and regularly backed up, thus providing protection against inappropriate access or loss of data. The recordings

will be deleted from the data network once the doctorate is completed and the thesis is ready for publication in the university library.

After each interview, field notes were made to record factors such as:

- the date, time and venue of the interview;
- the setting of the interview, whether it was formal and informal and whether there were interruptions;
- the researcher's own feelings about the interview;
- the key points from the interview and any new areas of interest.

The field notes were made within 24 hours of the interview, and an example is included in Appendix 11.

At the design stage, costs were obtained to get the interviews transcribed using a professional transcribing service. As funding was withdrawn, all of the transcribing was undertaken by the researcher. This had the advantage that the researcher was immersed in the data, as it was necessary to listen to the recording of each interview several times in order to complete the transcription. An additional benefit of researchers transcribing their own interviews is that they have participated in both the verbal and non-verbal exchanges with the participants. The main disadvantage of this approach was the time taken to complete this stage of the project. Britten (1995) estimates that a one hour interview can take six or seven hours to transcribe and this proved to be a reasonable estimate.

Another issue to be considered was whether verbatim transcription of the interviews was necessary. Halcomb and Davidson (2006) argue that verbatim transcripts can be an advantage in establishing an audit trail for supervisors, but caution that this should be weighed against the additional costs in terms of time and physical effort. They strongly recommend the use of written field notes and advise that the process of transcription should fit with the research design and the theoretical framework used in each study.

3.8.6 Sampling and data saturation

In this study the original aim had been to carry out 12 interviews with GPs, and 12 interviews with Community healthcare staff. There was a risk that GPs would not be willing to give up their time to be interviewed, so a convenience sampling approach (Marshall 1996) was considered as a fallback position.

The preferred approach for the interviews with GPs was to use a purposive sample. This involved sending an email to GPs who had previously expressed strong opinions either in favour or against the use of the Map of Medicine, asking them if they would agree to be interviewed. The intention was to ensure that deviant cases would be included, and the purposive sample also included a broad range in terms of experience (see Table 4).

Table 4. GP interviews

Interviewee	Type of practice	Age
GP01	Medium sized practice	40-49
GP02	Locum GP. Recently retired from a large practice	60 plus
GP03	Small practice	50-59
GP04	Locum GP	30-39
GP05	Medium sized training practice	40-49
GP06	Medium sized training practice	40-49
GP07	FY2 doctor, just completed 4 months in GP practice	20-29
GP08	Medium sized training practice	40-49
GP09	Medium sized practice	50-59
GP10	Part time GP in small practice	50-59
GP11	Large teaching practice	50-59
GP12	Large practice – First 5 GP	30-39
GP13	Medium sized practice – First 5 GP	20-29
GP14	Medium sized practice	50-59

The range went from a Foundation Year 2 doctor (a newly qualified medical practitioner) and First 5 GPs (newly qualified GPs), through to GPs who were coming towards the end of their careers. The sample also included full-time and part-time GPs, doctors who worked as salaried GPs as well as locums and partners, and doctors who were on the board of the Clinical Commissioning Group as well as working in clinical practice. Sampling stopped at 14 interviews when it was felt that no new themes were emerging.

The interviews with Community healthcare staff followed a similar approach. A purposive sampling approach was used, and the interviews included staff from across a wide range of professional groups (see Table 5). This included clinical staff who were in regular day to day contact with patients, as well as staff whose role was mainly focused on managing services that were delivered by staff who they line managed. Sampling stopped after 12 interviews, when no new themes were emerging.

Table 5. Community health staff interviews

Interviewee	Professional group	Age group
CH01	Podiatrist	40-49
CH02	Speech Therapist	50-59
CH03	Podiatrist	40-49
CH04	Specialist Continence Nurse	50-59
CH05	District Nurse	50-59
CH06	Advanced Nurse Practitioner	60 plus
CH07	District Nurse	50-59
CH08	Advanced Nurse Practitioner	30-39
CH09	Advanced Nurse Practitioner	40-49
CH10	Health Visitor Team Leader	50-59
CH11	Physiotherapist	40-49
CH12	Nurse Practitioner	30-39

Data saturation is frequently referred to in the literature on research methods, although it is difficult to find clear guidance on how to determine when saturation point has been reached or how to estimate an appropriate sample size for a purposive sample.

Guest et al (2006) report on studies of sexual health in Ghana and Nigeria and describe how, although 60 interviews were undertaken in the two countries, data saturation was reached after 12 interviews. They comment that in this instance, if the main interest was in high level themes, a sample of just six interviews would probably have been sufficient to enable useful interpretations of the data.

3.8.7 Data analysis

Qualitative research tends to produce large amounts of data. The process of analysis tends to begin during the various stages of data collection, and it is typical for the early stages of the analysis to influence the later stages of data collection (Pope, Ziebland and Mays 2000). Some commentators suggest that the use of more than one analyst can improve the reliability of the analysis, and Pope et al advise that this can be particularly helpful where there might be accusations of bias on the part of the researcher. Barbour (2001) also suggests that multiple coding should form part of the analysis. Although it was not practical for more than one person to repeat all of the analysis, it was considered desirable for a second person to review some of the analytical process. This was the approach used, where a researcher from another university reviewed a sample of the transcripts and the coding frame.

Another technique used was to systematically make notes about the general themes that were emerging and the codes that might be used as the study proceeded, and to discuss those ideas and to explore possible new insights and interpretations on a regular basis with an NHS colleague who had experience of conducting qualitative research in primary care settings.

The approach undertaken to manage and analyse the interview data was a thematic qualitative analysis (Braun and Clarke 2006, Attride-Stirling 2001). A broadly deductive approach was taken (Bryman 2008 p.9-10) which was based around the testing of pre-existing theories about the reasons why the implementation of e-health systems tends to succeed or fail. However, as well as looking for anticipated themes in the analysis, it was considered important to look for emergent themes (Ziebland and McPherson 2006, p.407). The epistemology underpinning this approach was interpretivist (Bryman 2008, p.366-7), which emphasises that the social world should be understood through examining the interpretation of that world by its participants.

The data analysis involved a number of stages, as described below.

Familiarisation

The first stage of the analysis involved familiarisation with the raw data. This entailed listening to the recording of each interview and then transcribing that interview. There were several iterations of listening to each interview and correcting the transcription, so that the researcher was immersed in the data. The other element of familiarisation involved reading the field notes, and then re-reading the transcripts (Ziebland and McPherson 2006, p.408).

Developing the thematic analysis

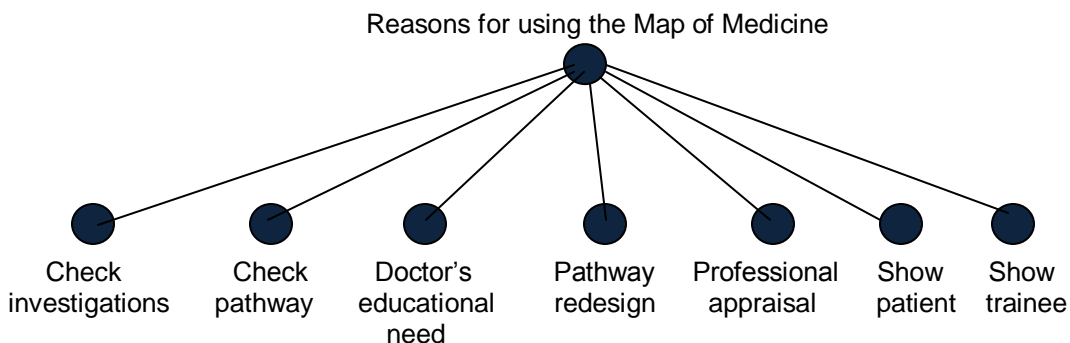
This involved identifying the key issues, concepts and themes by which the data could be examined. It drew on issues identified in the interview guide, but also included themes that came directly from the research participants. The codes were written onto post-it notes and were grouped together so that each code was assigned to a theme.

In the context of the research project, a theme “*captured something important about the data as it related to the research question, and represented some level of patterned response or meaning within the data set*” (Braun and Clarke 2006, p.82). A theme was therefore more than a matter of how frequently a term or phrase appeared in the data, and depended on whether it was relevant to an important aspect of the research question.

At this initial stage of the analysis the themes included how the participants first became aware of and engaged with the Map of Medicine, the factors that influenced whether the respondent would be likely to adopt any new e-health system, the reasons they gave for using the system (if they used it), and the reasons for not using the system.

As an example, Figure 3 shows how, under the general theme of “*Reasons for using the Map of Medicine*”, several possible codes were identified. These included using the system to check the investigations that were recommended for a suspected diagnosis, to check the recommended care pathway for a given condition, or to show the pathway to a patient or to a trainee clinician.

Figure 3. Example of a theme and sub codes



In order to reduce the risk of discarding data that might be required later, a sub-theme labelled “other” was created to hold any data that was not a good fit for any of the other sub themes.

Testing

This involved testing the coding frame with three transcripts, and making some adjustments. At this point the themes and the coding frame were discussed with a researcher from another university, who had experience of undertaking qualitative research.

Coding

After testing, all of the transcripts were loaded into the NVivo software package, and the thematic analysis was then applied to all of the data. Each transcript was examined, and the relevant sections of text were highlighted using NVivo and the coding frame was applied to the relevant sections.







































Analysis

The process of thematic analysis was an iterative process which had started with the use of post-it notes, before moving on to use NVivo to manipulate the data from the interview transcripts. As Cousins and McIntosh observe (2005, p.597) the use of software such as NVivo can reduce the more laborious aspects of managing the data, but it is still the up to the researcher to code the data and to make sense of it. Although the software was merely a tool to support the analysis, the use of NVivo did make it feasible to review the coding framework and to go through several iterations with the interview data and to refine the framework as additional interviews were coded, in a way that would have been much more difficult if it had all been done manually. During those iterations passages of the interview transcripts were highlighted for possible verbatim quotation in the analysis, and care was taken to ensure that those quotations would not reveal the identity of the research participant.

The flexibility from the use of NVivo made it easier to start to develop possible explanations, and then to return to the data to check those explanations, particularly where there appeared to be inconsistencies in the data. For example, when the thematic analysis was applied to the interviews with GPs, it was clear that there were issues relating to financial austerity and pressure to follow referral guidelines that might restrict their freedom to act, but this had not emerged in the coding of the interviews with Community health staff. The data was therefore re-examined to attempt to identify possible explanations for those inconsistencies.

An example extract from the coding framework is included in Figure 4, and this shows some of the main themes that were identified from the phase three interviews.

Figure 4. Example coding frame

	Name		Sources	References
	Attitude to e-health		14	24
   		Depends on topic		5
		Early adopter		8
		Middle to late adopter		4
		Prefer using paper systems		1
	Impact of using MoM		7	18
	    	Decide what to do next		2
		On duration of consultation		4
		Interrupts flow of consultation		1
		Patient understanding		4
		Shared decision making		2
	Influencing factors		14	75
	        	Avoid info overload		10
		Ease of use		6
		Enables shared decision making		6
		Need to keep up to date		2
		Patient expectations		5
		Provenance & trust		9
		Recommended by respected peer		5
		Speed		3
	Info sources on EBP other than MoM		14	45
	         	BNF		5
		CKS		3
		Cochrane		1
		Google		3
		GP Notebook		3
		NICE		7
		Other		2
		Patient.co.uk		4
		Wikipedia		1
	Initial engagement		14	77
	    	Concept restricted freedom to act		2
		Enrolment as user		10
		First impressions		13
		How did they hear of it		12
		Keen to use it		6

The themes shown here include how the participant initially engaged with the new system, their attitude to the introduction of new e-health systems, and the information sources about evidence-based practice they used in addition to the Map of Medicine. In the first round of data analysis separate coding frames were developed for the interviews with GPs and Community staff, but these frames were later combined to support comparisons of the two study groups.

The coding and analysis of the data included both deductive and inductive elements. Some of the coding followed on from the literature about factors that promote or inhibit the implementation of e-health systems (Murray, Burns et al 2011, May, Mair et al 2013, Cresswell, Bates et al 2013), but several themes emerged from the data. For example, the coding frame in Figure 4 shows the theme of “*Influencing factors*” which referred to the reasons that participants gave for deciding whether to adopt any new e-health system. It had been anticipated from previously published research about the Map of Medicine (Brennan and Mattick 2010) that the speed of the system and ease of use would be the major factors, but other issues such as the expectations of patients and the provenance of the information emerged as important factors.

The evolution of the coding frame also enabled the analysis to move beyond the semantic content, to a consideration of latent themes. For example issues concerning professionalism emerged in the data, and this initially appeared to relate to participants being able to demonstrate to their peer group that their clinical practice was evidence-based. However on closer examination of the data from the interviews with community nursing staff there appeared to be an underlying theme about their place in the professional hierarchy, and a need to demonstrate to doctors that they, as nurses, were following evidence-based guidelines.

It should be noted that the concepts of NPT were not used as a coding frame for the initial analysis of the interview data presented in sections 4.7 and 4.8. However, the concepts of NPT were used in section 5.6 as a framework for discussing the results of the research project, in order to explore possible explanations for the outcome of the implementation of the Map of Medicine in the area covered by the case study, and to gain an understanding of why there was such a wide range of normalisation within and between the study groups.

It is recognised that there are potential pitfalls in the methods that were used, and these are discussed in section 6.3.

3.9 Reflexivity

Reflexivity plays an important role in a largely qualitative research project such as this, and central to that notion is an awareness of the circumstances under which the research is conducted. This has required regular questioning of the researcher’s own assumptions about how the data sets have been collected and analysed.

As the researcher is an NHS senior manager with a background in health informatics, research participants who worked in clinical practice were likely to perceive him as someone who had little shared experience with their own working practices.

Throughout the study the researcher regularly reflected on the impact that his own assumptions might have had on both data collection and analysis, and a contemporaneous research diary was kept throughout the period of the study to record the researcher's thoughts and feelings. The way in which the research project was approached was influenced by the researcher's own professional background and previous work experience, and also by the researcher's supervisors and NHS employers. It was considered important to acknowledge that this was bound to have an influence over what data was collected, how it was collected, and how it was analysed.

A reflective commentary is provided in section 6.4.

3.10 Ethical issues

This section provides a brief outline of the main ethical issues, and further consideration is given in the reflective commentary in section 6.4.

As part of the researcher's reflection on his own role as a researcher, he has reflected on the ethical aspects of the research project. Going through the process of applying for ethical approval from the local NHS Research Governance organisation, and also through the Department of Health's Research Ethics Approval Committee for Health at the University of Bath, has enabled the researcher to become more aware of the ethical issues involved, by helping to reflect on how and why it was planned to undertake the research project.

The research did not involve patients or members of the public and did not require access to patient records. The project involved interviews with staff from the NHS and Department of Health, and with staff from suppliers of e-health systems. Although many of the participants were not known by the researcher, some of the people interviewed were known prior to the study.

3.10.1 Consent

A crucial element of the ethical considerations of the study was to ensure that research participants were adequately informed about the study and were able to give informed consent to participate.

Potential participants were provided with an information sheet which explained the background to the project and they were asked to sign a consent form before interviews were held. The participant information sheet explained in plain English what the study was about, what would be involved if they agreed to take part, and what would happen to the information that was collected. The information sheet explained that it was intended to include some verbatim extracts from the interviews in the research reports, but that any direct quotes would be anonymised. The information sheet advised participants that they had the right to withdraw from the project at any time without giving a reason, and it also provided contact details for the academic supervisor. The interviews were voluntary and were arranged at a time and location that was convenient for the participant.

To ensure that participants were able to give informed consent, each interview started with an explanation of the aims of the study, and interviewees were asked if they would agree to the interview being recorded. If participants were uncomfortable with the interview being recorded, notes were taken instead.

Another ethical issue that arose was the status of comments that participants would sometimes make after the end of the formal interview. In each interview, after the final question had been asked, participants were asked if there was anything else they should have been asked, and if there were any other comments they would like to make. This issue is considered in section 6.4.

3.10.2 Confidentiality

Maintaining confidentiality was another important ethical issue, and care was taken to ensure that the data collected from research participants was appropriately protected. Research participants were assigned a code number so that data could be anonymised. All of the data collected for the project in the form of paper records was stored in a locked cabinet within a secure area of the PCT offices. Any electronic files relating to the project were stored in a secure area of the PCT data network, which was backed up and protected from computer viruses.

The research design was also discussed with the PCT's Information Governance lead to ensure that the design complied with the PCT Information Security & Confidentiality Policy.

3.11 Summary

In this chapter the aims and objectives of the project have been described, the research design for the project has been presented, and the reasons why the approach was considered suitable for this particular research question have been explained.

The various elements of the data collection process have been described. These include quantitative methods involving the use of an online survey, and the use of qualitative methods that involved semi-structured interviews with NHS staff working in primary and community care settings. The steps taken to increase the validity and rigour of the project are described, including the approach taken to sampling and data analysis. The ethical issues arising from the study, and issues of consent and confidentiality, have also been discussed.

The next chapter describes the findings from the study.

Chapter 4 – Findings from the research

“Not everything that can be counted counts, and not everything that counts can be counted” William Bruce Cameron (Cameron 1963, p.13).

4.1 Introduction

At the beginning of the research project, little was known about whether health professionals in the study population actually use the Map of Medicine.

This chapter discusses the findings of the quantitative and qualitative phases. The first section phase describes the findings from an online questionnaire that was sent to health professionals working in primary and community care settings in one Primary Care Trust. Those findings are compared with quantitative data provided by the system supplier and by the relevant Strategic Health Authority.

The results from the qualitative phase of the study are also presented. This includes data from the macro and meso level interviews with NHS staff working at national and regional level, and also the results from the micro level interviews that were held with GPs and Community health staff working in one local health community.

4.2 Quantitative phase

An online questionnaire was designed to assess the level of awareness of the Map of Medicine and to investigate the level of use in the study population, to address objective one as set out in section 3.2. The content of the questionnaire was designed to enable the results to be compared with the only other similar study that had been published (Brennan and Mattick 2010). The distribution of the questionnaire to the relevant staff in the Primary Care Trust was arranged through the Medical Director and Director of Community Health Services respectively.

4.2.1 Response rate

This element of the fieldwork was undertaken during February and March 2012, which was a period when the NHS in England was going through a considerable amount of organisational change. To mitigate the risk of a low response rate a reminder email was sent out by the PCT Medical Director and Director of

Community Health Services respectively. No further reminders about the questionnaire were sent as it was felt this could be counter-productive, given that it was intended to approach some of the study population for the qualitative phase of the study. The final response rate for GPs was 33% (45 out of 137) and for Community health staff it was 32% (220 out of 687).

4.2.2 Completion of the questions

For GPs the completion rate was close to 100% for all questions up to Question 7 on the frequency of use. The completion rate was lower for the questions about the use of the Map of Medicine during or outside a patient consultation, but the majority of GPs responded to those questions.

Fewer Community health staff completed the questions about the use of the Map of Medicine during a consultation, although a higher proportion of Community health staff than GPs answered the question about the use of the Map of Medicine outside a consultation. Further details about the completion rate are given in Appendix 4.

4.3 Characteristics of the respondents

In this section the characteristics of respondents to the online questionnaire are compared with the total study population. It had been suggested by local NHS senior managers that the adoption of e-health systems was related to age, and that older NHS staff would be less likely to adopt new technologies. It was therefore decided to compare the age distribution of the respondents with that of the whole of the study population.

4.3.1 General Practitioners

Table 6 shows the age distribution of the GPs who responded to the online questionnaire, compared with the age distribution of all GPs which was obtained from the Medical Directorate of the PCT. Visual inspection of the data suggests that the survey respondents were similar in terms of age, and a Chi squared test indicated that there was no statistically significant difference. ($X^2=1.01$; $P=0.798$)

Table 6. Age distribution of GPs

Age	Survey		All GPs	
	n	%	n	%
20-29	1	2%	2	1%
30-39	16	36%	46	34%
40-49	16	36%	43	31%
50-59	10	22%	35	26%
60-69	2	4%	10	7%
70-79	0	0%	1	1%
Total	45	100%	137	100%

4.3.2 Community health staff

Table 7 shows the age distribution of the Community health staff who responded to the online questionnaire, compared with the age distribution of all Community health staff. Visual inspection of the data suggests that people aged 30-39 were under represented in the survey, and a Chi squared test indicated that there was a statistically significant difference between the respondents and the total study population. ($X^2=7.39$; $P=0.0117$)

Table 7. Age distribution of Community staff

Age	Survey		All staff	
	n	%	n	%
20-29	25	11%	87	12%
30-39	33	15%	175	23%
40-49	78	35%	245	32%
50-59	70	32%	202	27%
60-69	10	5%	46	6%
70-79	0	0%	1	0%
No response	4	12%	0	0%
Total	220	100%	756	100%

4.4 Responses to the questions

4.4.1 Use of the Map of Medicine - General Practitioners

The first main finding from the survey was that 56% of GP respondents stated that they did use the Map of Medicine. Table 8 provides a breakdown of use, by age group. Although respondents in their 30s and 40s reported slightly higher use of the Map of Medicine than respondents in their 50s and 60s, a Chi squared test indicated that this was not statistically significant. ($X^2=0.510$; $P=0.917$). The topic of the adoption of technology by different age groups is considered in section 4.10.

Table 8. Use of the Map of Medicine by age group - GPs

Age	Use the Map of Medicine			
	Yes		No	
	n	%	n	%
20-29	0	0%	1	100%
30-39	9	56%	7	44%
40-49	10	63%	6	37%
50-59	5	50%	5	50%
60-69	1	50%	1	50%
Total	25	56%	20	44%

4.4.2 Use of the Map of Medicine - Community health staff

The second main finding from the survey was that 26% of Community health respondents stated that they did use the Map of Medicine. Table 9 provides a breakdown of use, by age group. Unlike the GPs, younger respondents reported lower use of the Map of Medicine compared with those in their 50s. However a Chi squared test indicated that this was not statistically significant. ($X^2=5.37$; $P=0.147$).

Table 9. Use of the Map of Medicine by age group – Community staff

Age	Use the Map of Medicine			
	Yes		No	
	n	%	n	%
20-29	2	10%	18	90%
30-39	8	27%	22	73%
40-49	14	22%	49	78%
50-59	24	38%	40	63%
60-69	0	0%	7	100%
Total	48	26%	136	74%

4.4.3 Frequency of use

Table 10 shows the frequency of use of the Map of Medicine by GPs and Community health staff respectively. The tables indicate that of those GP respondents who use the system, 40% reported that they do so at least once a week. This is in marked contrast to Community health staff, where only 13% use the system at least once a week.

Table 10. Frequency of use

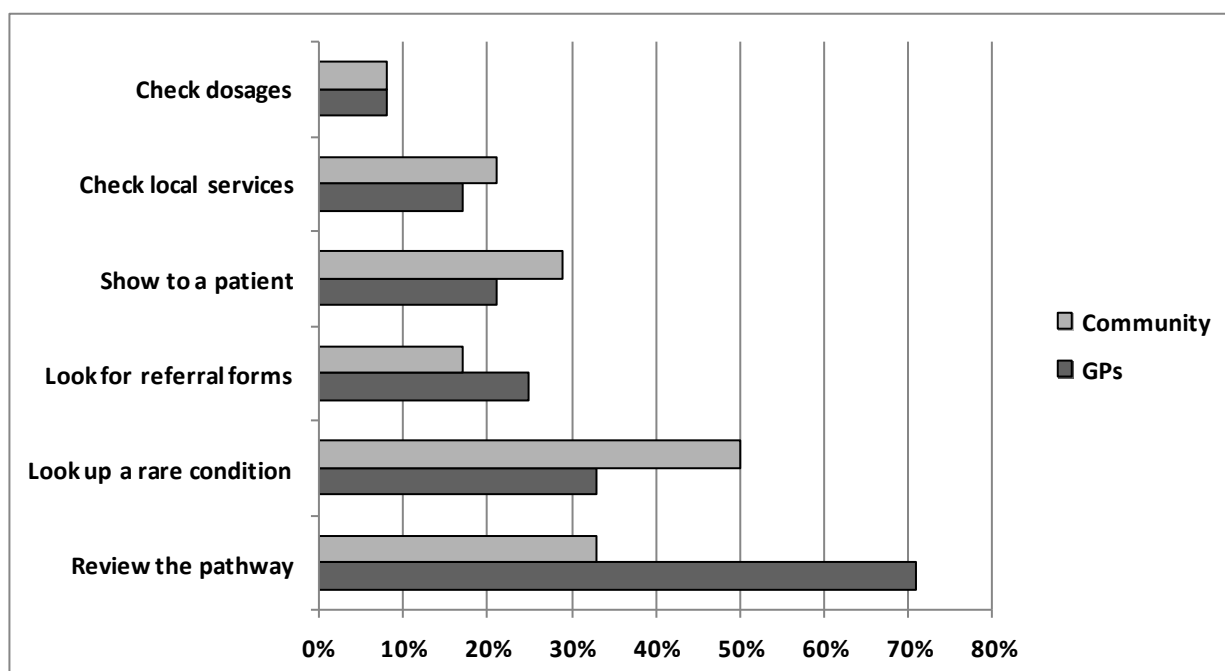
Frequency	GPs		Community staff	
	n	%	n	%
Once a week or more	10	40%	6	13%
About once a month	12	48%	28	58%
About once a year	3	12%	14	29%
Total	25	100%	48	100%

4.4.4 Use during a consultation

The questionnaire asked about the use of the system during a patient consultation. Respondents were invited to indicate the purposes for which they used the system, and to select all categories that applied. Figure 3 shows that for GPs the most common use was to review the recommended care pathway for a given condition (71%), followed by looking up a rare condition (33%), and looking for referral forms (25%).

The reasons for using the system during a consultation reported by Community health staff were slightly different. The most common use was to look up a rare condition (50%), to review the recommended pathway (33%), and to show the pathway to a patient or carer (29%).

Figure 5. Use during a consultation



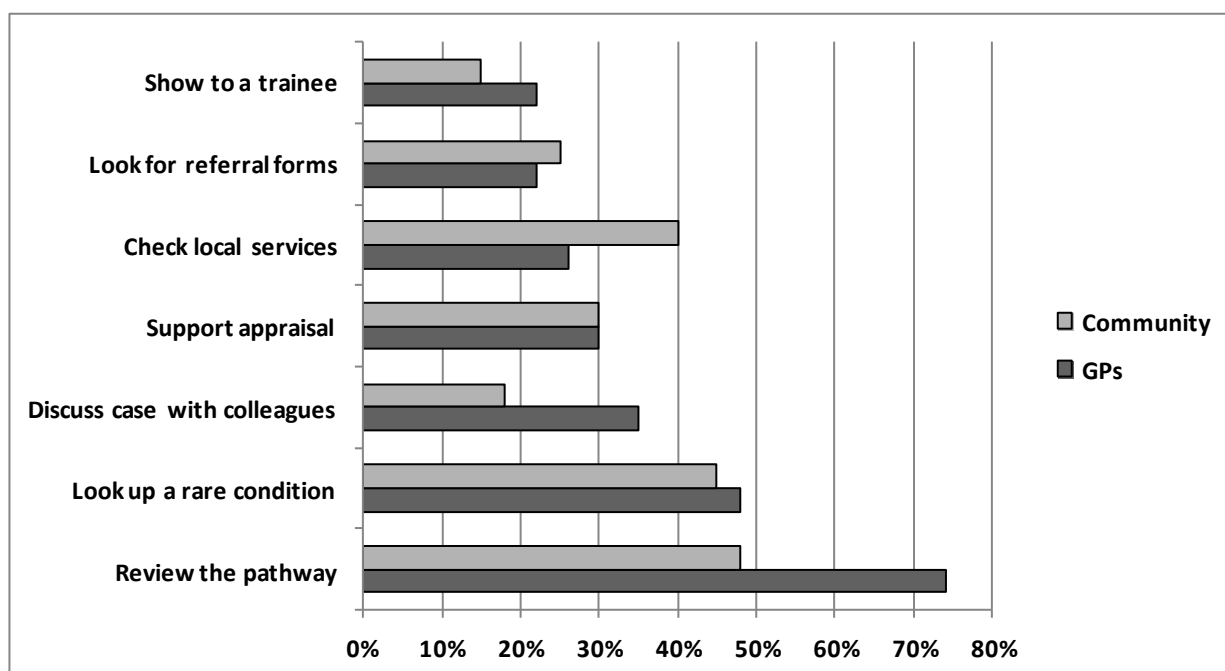
4.4.5 Use outside a consultation

The questionnaire also asked about the use of the system outside a patient consultation. Respondents were asked to indicate the purposes for which they used the system, and to select all categories that applied.

Figure 4 shows that for GPs the most common uses were to review the recommended care pathway (74%), look up a rare clinical condition (48%), discuss the care of a patient with clinical colleagues (35%) and to support their professional appraisal (30%).

Figure 4 also shows the use made of the Map of Medicine outside a consultation by Community health staff. The most frequently reported uses were to review the recommended care pathway (48%), to look up a rare clinical condition (45%), to check the availability of local services (40%), and to support their professional appraisal (30%).

Figure 6. Use outside a consultation

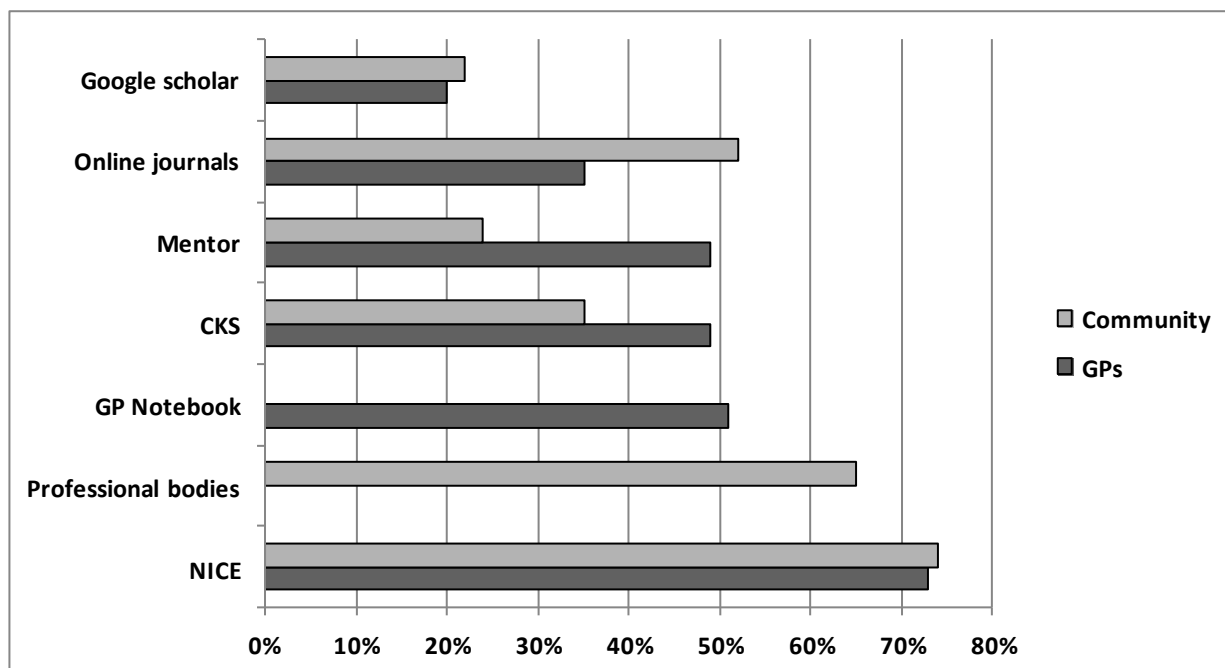


4.4.6 Other systems used to support evidence-based practice

The questionnaire asked respondents to indicate which online systems they used, other than the Map of Medicine, to support their evidence-based practice. Figure 5 shows that the system most commonly used by GPs was the NICE website (73%), followed by GP Notebook (51%), Clinical Knowledge Summaries (CKS) (49%), Mentor (49%) and online journals (35%). It was notable that 20% of respondents cited Google Scholar as a source of information to support their evidence-based practice.

For Community health staff, the NICE website was also the most frequently used source of information to support evidence-based practice (74%). Unlike GPs the second most frequently cited sources were websites belonging to professional bodies such as the Royal College of Nursing (65%), followed by online journals (52%), NHS Evidence (38%) and CKS (35%). As with GPs, 22% of Community health respondents cited Google Scholar as one of the sources of information to support evidence-based practice.

Figure 7. Systems used to support evidence-based practice



4.4.7 Reasons for not using the system

The questionnaire asked respondents if they ever use the Map of Medicine. If they answered no, they were invited to give the reasons why and a free text box was provided.

4.4.7.1 GPs

Of the 17 GPs who gave reasons for not using the Map of Medicine, five of them had tried the system but found other e-health systems more useful for supporting their evidence-based practice. Two respondents stated that they did not use the Map of Medicine because they did not like the layout of the system and had found that navigation around it was not user friendly.

A theme that emerged from the free text comments was a preference for paper-based systems over online systems. One GP commented that they found using an online system like the Map of Medicine during the consultation could be distracting for both the patient and the doctor, and that important cues from the patient might be missed.

Another respondent commented that the use of an online system to review a care pathway during a consultation would not instil confidence in patients.

4.4.7.2 Community health staff

The majority of the free text comments from Community staff about why they did not use the system related to not knowing enough about it, and not being sure how to use it or how the system could help them do their job.

A few comments related to a lack of confidence in using any e-health system without formal training, and one respondent described how she would ask her colleagues for advice about evidence-based practice or would refer to paper guidelines rather than use an online system. Two respondents commented that they had insufficient time at work to refer to the system.

Another theme that emerged was about the relevance of the system to the work of Community health staff. One respondent described the system as being written from a GP's perspective and another said that they found it very medicalised.

4.5 Triangulation with other data sources

Triangulation is defined by Bryman (2008, p.700) as "*the use of more than one method or source of data in the study of social phenomena so that findings can be cross checked.*" For this particular research project, data was sought from the system supplier and from the relevant Strategic Health Authority to enable triangulation with the results from the online questionnaire.

4.5.1 The system supplier

At the time of the fieldwork, no monitoring data about the use of the Map of Medicine was available under the contractual arrangements of the NHS National Programme for IT.

However, the system supplier agreed to provide some data about the use of the system in the relevant local health community, and this data covered the same time period as the online questionnaire. Unfortunately most of the usage data provided related to the number of visits to the Map of Medicine website, and to the number of views of pages on the Map of Medicine website. In the first version of the usage statistics, data was provided on the total number of visits to the website. It was difficult to infer much from this data, as it was possible that a small number of individual users could have accounted for a large number of the visits to the website.

Subsequently the system supplier provided data that was broken down to identify the number of unique users that visited the website. This indicates that there were 36 individual users in the month that the online survey took place, and that there was a total of 82 visits to the website. Due to the fact that users were able to

access the website by two different methods (via an NHS smart card or via an NHS Athens account), it was not possible to distinguish between usage by GPs and by Community health staff. It was therefore difficult to make any direct comparisons between the results from the online survey and the data provided by the system supplier as the latter provided a snapshot for one clearly defined period whereas the survey asked respondents about whether they ever made use of the system.

4.5.2 Strategic Health Authority

Data about the adoption of the Map of Medicine was also published by the Strategic Health Authority covering the Primary Care Trust that was the location for the case study. This consisted of 18 separate metrics broken down into three main categories, as shown in Table 11.

Table 11. SHA metrics for progress on implementation

<i>Category</i>	<i>Metric</i>
Awareness and engagement	Project manager in post Clinical governance process in place MoM awareness event held
Adoption	Number of localised pathways in progress Number of localised pathways published MoM being used to commission services
Business as usual	MoM successfully implemented MoM being used Adopted as normal working practice

In the opinion of the SHA, just over half of the Primary Care Trust projects in its area had achieved a level of maturity where the system was considered to have been implemented and was starting to deliver benefits to the local health community. The Primary Care Trust that was the subject of the case study was considered by the SHA to have reached that level of maturity.

4.6 Macro and meso level interviews

4.6.1 Background

The first phase of the project was focused on the macro and meso levels, and involved interviews with key staff from a number of organisations. The theoretical framework for these levels is taken from the work of Greenhalgh and Stones (2010) who consider sociotechnical systems at three levels, in order to provide a more complete explanation of the topic being studied. The macro level relates to

national policies and priorities, and professional norms and standards; the meso level relates to the organisations and social groupings through which people interact; the micro level relates to what the technology does (or does not) do in a particular setting.

In section 3.6 it was explained that this part of the study involved 13 interviews with senior staff from NHS Connecting for Health and from different SHAs, Project Managers responsible for implementing the Map of Medicine in three local health communities, and with staff from the system supplier.

An interview guide was developed for the meso and macro level interviews, and the topics covered were based on previous evaluations of other aspects of the National Programme for IT (Greenhalgh, Stramer et al 2010b, Robertson et al 2010), although the guide was adapted depending on the context of the interview.

For example, in the interviews with NHS senior managers from the national and regional level, the interview focused on their opinion about the aims of the implementation of the Map of Medicine, and included questions about the cost of the programme, the criteria that were used to measure the success of the programme, and what were regarded as the lessons that had been learned from the implementation of the Map of Medicine.

Despite several attempts, it proved to be very difficult to gain access to some of the senior staff from the Department of Health and NHS Connecting for Health who had played a key role in the decision to procure the Map of Medicine for the NHS in England. To address this gap, interviews with three key stakeholders that had been arranged by the NHS Institute for Innovation and Improvement and published on You Tube were transcribed for analysis (Gray n.d., Kumar n.d., Stein n.d.).

4.6.2 Department of Health and NHS Connecting for Health

In order to evaluate an e-health system such as the Map of Medicine it is important to compare progress against the original aims and objectives. The decision to procure the Map of Medicine for the NHS in England was part of the NHS National Programme for IT, and that was subject to a very formal process (Greenhalgh, Stramer et al 2010b, p.47). Requests for investment were prepared by senior staff in NHS Connecting for Health, they were then considered by the Department of Health Capital Investment Board, then by the government ministers responsible for the NHS, and finally by HM Treasury. Investments required the production of a series of business case documents. The first is the Strategic Outline Case which sets out why the investment is needed and explains the anticipated benefits from that investment. Subject to approval, the process continues through to the production of a Full Business Case.

In the interviews it was reported that the decision to procure the Map of Medicine formed part of the procurement of the Care Records Service component of the

National Programme for IT. NHS Connecting for Health developed a document called an Output Based Specification (OBS), which described the features that a Care Records Service was required to have, and that OBS was circulated to shortlisted suppliers. Part of the OBS referred to the need for a knowledge management and decision support system as part of the solution. All of the system suppliers awarded contracts to become Local Service Providers for various parts of England responded to the OBS by stating that their proposed solution to the requirement for a knowledge management and decision support system would be through the provision of the Map of Medicine. For the NHS in England there was therefore no separate business case for the investment in the Map of Medicine, as it was subsumed into a much bigger programme of work. The absence of a business case meant that there was no single document that clearly set out the aims and objectives for the investment in the Map of Medicine that was made by the Department of Health.

The interviews with staff from NHS Connecting for Health did attempt to elicit details about the aims and objectives of investing in the Map of Medicine and the criteria that were used to assess the success of the programme, but these proved to be elusive. It became apparent that there was no separate appraisal of the options, as the Map of Medicine had been procured as part of a much larger initiative. The interviews did include questions about the costs of the programme. These were met with a response that such matters were commercial in confidence and could not be discussed, although it was stated that:

“the Map was a minor component of the overall National Programme for IT contract.” (MM04)

Staff at NHS Connecting for Health also stated that their role was to procure e-health systems, but the matter of whether they were used by front line staff was up to the NHS.

Although several approaches were made to senior staff from the Department of Health and NHS Connecting for Health, most of those requests were declined. The researcher therefore transcribed interviews with key stakeholders that had been published on You Tube by the NHS Institute for Innovation and Improvement. It is important to note that these interviews were not undertaken by the researcher, but they were in the public domain.

Several informants had referred to the key role in the decision to invest in the Map of Medicine that had been played by Sir Muir Gray, who at that time was Director of Knowledge Process and Safety at the Department of Health. In the interview about the Map of Medicine on You Tube (Gray n.d.) he talks about the knowledge paradox, that:

“people are overwhelmed with poor quality knowledge. They can’t find the knowledge they need, when they need it.”

Gray also talked about how “*the gap between what we know and what we do yawns like the Grand Canyon*” and stated that the Map of Medicine could help the NHS to achieve desired outcomes by making clear what was wanted in terms of care pathways.

One of the interviewees did state that it was expected that the system would help address the problem of information overload, that having regularly updated pathways made it more likely that NHS staff would follow best practice and that:

“the Map is better than a yellowing piece of paper” (MM04)

The interviews at national level revealed that there were no explicit success criteria that had been defined at the outset of the implementation of the Map of Medicine, and no national set of metrics that were used to monitor progress in terms of implementation. The DH recognised the need for a clearer approach to assessing the benefits that were being achieved from the implementation of the Map of Medicine, and it was agreed by the Board of the NHS National Programme for IT that the Chief Information Officers of the SHAs would take responsibility for developing a national set of metrics to assess the benefits arising from the system, and also for improving the definition of the contract with the system supplier to ensure that NHS priorities were addressed. These actions were agreed between NHS Connecting for Health and the SHAs immediately before the General Election in 2010, but because of the change of government the priorities for the National Programme for IT were changed and the work that had been agreed was never undertaken.

4.6.3 Strategic Health Authorities

The approach to implementing the Map of Medicine varied between the SHAs. For example in one of the SHAs in the north of England the project was led by the Clinical Advisory Team and the SHA took care to emphasise that it was a clinical rather than an information technology initiative. At the time the Map of Medicine project was launched by that SHA a statement was issued by the Senior Clinical Advisor stating that:

“the Map is an intuitive, easy to use collection of clinical pathways that can be used to ensure our patients’ care adheres to evidence-based practice”.

That SHA decided to set up a Regional Programme Board to manage the implementation chaired by the Clinical Lead for the National Programme for IT, supported by a dedicated Programme Manager. The Map of Medicine was regarded as being a good fit with the broader policy initiative to redesign care pathways to improve patient experience. The SHA stated that using the Map of Medicine would enable local NHS organisations to avoid the high cost of developing pathways from scratch, and that the system would help NHS staff to reduce the risks of information overload.

In contrast, the Map of Medicine project in another SHA was placed firmly within its National Programme for IT governance framework, although there was an attempt to link it up with the separate clinical pathways group.

In both of these SHAs it was decided to start the implementation in a small number of local health communities which were selected as early adopters, with mixed results.

“We gave out £20,000 to help the local health communities to get started, and in some places they took the money and only got as far as localising a single pathway so there was a lot of wasted effort. In some communities like XXXX the enthusiasm just waned, whereas in YYYY they stayed with it and it went quite well.” (MM05)

In a third SHA there was a concerted effort to develop and publish case studies to show how the Map of Medicine had been used as part of a programme to redesign care pathways that spanned primary, secondary and community care settings. These case studies were published by the SHA to share the experience that had been gained in the early adopter health communities. In the interviews with the SHAs it became apparent that there was a tension between the initial idea of promoting the Map of Medicine as an e-health system that could support evidence-based practice, and the later development of promoting it as a system that could enable local health communities to deliver care in a more cost effective way.

Evidence was presented in the interviews about the number of local health communities that were considered by their respective SHAs to have implemented the Map of Medicine. This indicated that in some parts of England the relevant SHA considered that the majority of local health communities had implemented the system, but in other areas the take up was quite low. The interviews revealed that at SHA level, there was contention between NHS senior managers about whether the investment in the Map of Medicine was worthwhile.

“If all SHAs used it we’d get good value There’s a perception that it’s a lot of money, for not getting very much.” (MM03)

The interviews also revealed some tension between the SHAs and NHS Connecting for Health. A national Map of Medicine User Group was set up by the system supplier and included representatives from the SHAs and from Connecting for Health. It was reported by SHA staff that they felt that the NHS representatives did not work well together to present a united front to the system supplier. They felt that the NHS was not very clear about what it wanted from the system and how it should be developed to meet the needs of users. They reported some frustration due to the fact that the contractual relationship was between NHS Connecting for Health and the system suppliers, albeit with the Local Service Providers as intermediaries, rather than between the SHAs and the system supplier.

“CfH had bigger fish to fry, and the Map and the contract for it just wasn’t a priority for them.” (MM05)

One example cited in the interviews was the lack of data on usage of the Map of Medicine. Through the User Group, the SHAs had asked the system suppliers to provide monitoring data on the level of use of the system, but were advised that this was outside the terms of the existing contract and would therefore be subject to contractual negotiations. However, due to the governance structure surrounding the National Programme for IT, variations to contracts were required to go through a complex approvals process. The SHA respondents reported that, despite prolonged discussions, usage statistics were never provided as part of the basic service although these were available for an additional payment.

In the absence of any national success criteria the SHAs developed their own performance monitoring tools. Staff from one of the SHAs described how they had hoped to develop some metrics to assess the position before and after the implementation of the Map of Medicine and had tried to triangulate the evidence, for example to see if the number of GPs using the system went up and the number of inappropriate referrals went down, but ultimately it was left to the local health communities to develop their own metrics. In another SHA the implementation of the Map of Medicine was viewed as being one more component part of the overall NHS National Programme for IT, and a set of metrics was developed so that the implementation of the Map of Medicine could be measured alongside the other elements of the National Programme for IT. These were mainly quantitative measures and were described in section 4.5.2.

However, throughout the interviews with SHA staff and the examination of numerous project documents there was no evidence of an explicit benefits plan or a set of success criteria that could be used for evaluation purposes.

4.6.4 NPfIT Programme Management

In the part of the NHS covered by the case study, a management structure had been set up to take responsibility for the implementation of the various initiatives that formed part of the NHS National Programme for IT. A pooled budget was allocated by the SHA to a group of PCTs, Acute Trusts and Mental Health Trusts and a number of staff, such as programme and project managers and trainers, were recruited to support the programme.

There was a formal governance structure, with a Programme Board chaired by the Chief Executive of one of the PCTs, and with senior NHS managers and clinicians from the various local organisations in that conurbation. A separate project board was set up for each of the projects that came under the National Programme for IT, and those project boards were accountable to the main Programme Board.

A detailed project plan was drawn up which identified the tasks that would be involved in the implementation of the Map of Medicine, the resources that would be required to successfully implement the system, and the risks that would need to be managed.

In the interviews with members of staff in the dedicated team working on the National Programme for IT, it became clear that some staff saw their role as being primarily about the technical aspects of the project, such as ensuring that the software was successfully installed on the desktops of GPs and other front line NHS staff. The staff in the National Programme for IT team regarded it as being the responsibility of the individual NHS organisations to get their staff to actually use the system. There was also a perception that the reasoning behind the implementation of the Map of Medicine had shifted from an initial focus on delivering high quality care to an emphasis on supporting the delivery of more cost effective care.

Although progress reports were produced during the implementation period, these were largely focused on the completion of technical tasks such as the installation and testing of software, rather than on raising awareness and assessing the use of the e-health system by the target audience.

One of the senior NHS managers felt that the task of implementation was made more difficult because of the negative views of clinicians about other aspects of the National Programme for IT, such as Choose and Book.

“It was seen as being under the umbrella of the National Programme [for IT] so it was immediately tarnished and made engagement with GPs more difficult.” (MM01)

Another theme that emerged was the dissonance between the local NHS management views about the Map of Medicine, and those put forward by the SHA and NHS Connecting for Health.

“The project was a classic case of a product looking for a home. There was a message from on high that you’ve got to implement this. The project was lacking a clear reason for doing it.” (MM02)

The interviews also revealed tensions between the staff in the National Programme for IT team and those working in the respective PCTs. The former expressed the view that their role was to implement the software and deliver some training, but that getting the system adopted and embedded was the responsibility of the commissioning managers in the PCTs.

4.6.5 System suppliers

The system suppliers expressed a clear view about what the Map of Medicine was designed to do. In an interview published on You Tube the then Chief Medical

Officer of the company, Mike Stein (n.d.), described it as a refresher course or reference source for clinicians. He explained how the system had originally been developed by 26 GPs, 50 hospital consultants and 10 specialist nurses working in and around the Royal Free Hospital in London. The intention was to provide a visualisation of the evidence-based healthcare journey for a patient through the healthcare system, based on the best practice guidance from bodies such as NICE and the Royal Colleges. Stein was also very clear on what the system was not designed to do.

“What the Map doesn’t do, this is very important, it’s not an expert system. It’s not doing black box calculations in the background. It’s a map, it’s a guidance system.”

Stein described the importance of having a benchmark that provided a visualisation of the evidence-based patient journey, but emphasised that it should be recognised that in certain circumstances the patient may not fit that specific pathway. In such cases he argued that it was correct for the clinician to decide “*I’m going off piste*”, but that it was important to know when they were doing that.

The suppliers commented on the way that some GPs were using the Map of Medicine during patient consultations. They emphasised that the system was a complex clinical tool and was not designed to be read by patients, although the company did support the idea of showing patients where they are on the pathway.

A theme that emerged in the interviews was that the requirements of the NHS had changed since the system was first implemented. It was felt that originally the NHS was focused on using the system as a knowledge management tool to support promoting best practice and improving the quality of care, but since 2010 the NHS focus had shifted to how services could be delivered more cheaply.

The interviews revealed some frustrations concerning the contractual relationship with the NHS. In the early stages of the NHS National Programme for IT there was an explicit contract for a system to support knowledge management, and it had been acknowledged by NHS Connecting for Health that the Map of Medicine met the requirements set out in the Output Based Specification. However, the change in NHS policy led to tensions in the relationship between the NHS and system suppliers.

“It feels as if the NHS keeps moving the goalposts. There’s an explicit contract with the NHS, and then there’s an implicit contract, and the two are very different.” (MM12)

The interviewees also expressed a view that the NHS had treated the procurement of the Map of Medicine as a technology project, that there was little focus on the clinical content, and that it had taken a long time for the NHS to appreciate the significance of there being dialogue about the clinical content in the Map of Medicine.

It was stated that in many parts of the NHS the implementation of the system appeared to be undertaken by under-resourced IT departments. They argued that the implementation needed to be championed at senior level in the NHS organisations, with clinical input from the outset, rather than being seen as an IT initiative.

4.7 GP interviews

4.7.1 Background

In this section the results of the interviews with General Practitioners are presented. Interviews were held with 14 GPs working in the PCT covered by the case study, and a purposive sampling approach was used, as the intention was to ensure that deviant cases would be included. The interviewees ranged from GPs in the early stages of their career to those approaching retirement. The interviews covered doctors working as salaried GPs as well as locums and partners, and included GPs on the board of the Clinical Commissioning Group as well as those working in clinical practice.

The interview guide for the interviews with GPs and Community health staff was based on the concepts of NPT. Advice was sought from an expert in the use of NPT (Murray (*pers. comm.*) 4 April 2012) and it was decided that it would be inappropriate to include expressions such as Cognitive Participation and Interactional Workability in the guide, so the questions were phrased in simpler terms.

4.7.2 Initial engagement

In the interviews, participants were asked how they first became aware of the Map of Medicine. The most common methods were through attendance at the regular GP professional network meetings and through exchanges of emails with colleagues. Several GPs also referred to the role played by certain key individuals in raising awareness.

“It has been talked about for some years now by a local colleague who is very interested in it. He brings it into the conversation whenever we meet.... so it’s always in the forefront of the conversation. That’s how it comes in. There’s a local champion. Otherwise we probably wouldn’t know about it.”
(GP11)

Although a formal launch event for the Map of Medicine had been held by the PCT, very few GPs reported that they had attended that event. In the discussion about how they first came to hear about the Map, many of the GPs specifically referred to professional network meetings, either with other GPs or with clinicians from the local hospital. A key factor in the initial engagement of GPs appeared to be the

esteem that certain other colleagues were held in, which might make it more likely that they would set aside some time to consider the innovation.

“X was instrumental. Although we’ve had our ups and downs I’ve always admired his clinical judgement. I think he’s an ethically very sound doctor. When you’ve got people in the peer group, people who you respect, then you take notice.” (GP05)

The issue of how GPs did, or did not, become enrolled as users of the Map of Medicine was explored in the interviews. One of the newly qualified GPs described how her first experience of the system was when she worked in a training practice.

“It was one of the trainers. It was Dr X. He was a keen user of the Map of Medicine. So if I had perhaps a clinical question or we weren’t sure we’d look it up on the Map of Medicine.” (GP13)

Some of the more experienced GPs related how they had first started to use the system following a conversation at a practice meeting, and it was apparent that their awareness of new ways of working was influenced by Practice Managers as well as by fellow clinicians. Other GPs referred to the need to weigh up whether any new e-health system was worth the effort required to become familiar with it, in order that they could make an informed decision about whether to use it on a regular basis.

4.7.3 Factors influencing decisions to use e-health systems

A common theme that emerged in several was the need to keep up to date with developments in healthcare.

“The thing that’s difficult in General Practice is when things change. It’s trying to keep abreast of the changes. Things like referral pathways. If you miss that email or don’t go to that meeting, you don’t find out those things.” (GP06)

The theme of keeping up to date appeared to be a concern across the age groups. One GP described her concerns about junior doctors coming to work in her practice, and how they would not have sufficient knowledge of local health services or local care pathways. She felt that a system such as the Map of Medicine could address that gap in their knowledge. Another GP who was near the end of his career voiced his opinion that older GPs get increasingly out of date and tend not to know the newer care pathways. He felt that an e-health system that contained information about care pathways and referral criteria had the potential to help him refer patients appropriately.

A related theme that emerged was the feeling of information overload. A number of GPs described how it seemed impossible to read and digest all of the material that was sent to them, and this view was expressed by both experienced and newly

qualified GPs. One of the younger GPs cited an example of having received an email some months previously about a particular care pathway, and how she had spent 20 minutes looking for it without success.

An experienced GP described how he originally felt when e-health systems began to replace paper systems:

“I felt it was a great breakthrough, in my practice. I’ve been in practice you know, for long enough to remember when we had no computers. And trying to keep up to date was very, very difficult. So to suddenly be able to access this stuff at the touch of a button, it transformed things. It really empowered you.” (GP14)

Other themes that appeared to influence whether GPs would use an e-health system were speed and ease of use. The speed of getting to the desired information was felt to be crucial, and this in turn was influenced by how easy the system was to navigate. There was a wide range of GP perceptions about the ease of use of the Map of Medicine. Some of the more experienced GPs stated that the system was difficult to navigate and that it felt “clunky” to use, whereas one of the newly qualified GPs felt it was user friendly and could be used without any training. In a similar vein, the fact that the Map of Medicine presented information in a pathways format was cited as both a positive and a negative factor.

The other key theme that appeared to influence the decision about whether to use an e-health system was the provenance of the content. For example one GP described how they perceived the content of the Map of Medicine as being on a par with other sources of information about evidence-based practice.

“NICE, the Map of Medicine and BNF are officially sanctioned, so if you’re using it to justify what you’re doing you’ve got more weight. It’s more justifiable.” (GP13)

4.7.4 Reasons for using the Map of Medicine

Most of the interviewees described the ways in which they would use a variety of sources of information to support their evidence-based practice, and the Map of Medicine was one of many systems used. The online survey had indicated that many GPs used systems such as CKS, NICE and GP Notebook, and the interviews revealed the reasons why some GPs would use the Map of Medicine in preference to those other systems. A few GPs cited the fact that the Map of Medicine included local guidelines and referral forms as being an important factor, and one GP who was involved in the commissioning of services felt this was a significant issue:

“I would strongly support being able to localise things. I think that is the only way you’re going to address the health inequalities. You have to accept that if the needs are different, you may well have to do something.” (GP10)

The most common reason cited by GPs for using the system was to review the pathways on the Map of Medicine, to remind them of the tests and investigations that should be carried out. Some GPs felt that the Map of Medicine was particularly relevant when they were faced with a patient with a rare condition, and described how they might be faced with a condition that they had last seen in medical school thirty years ago.

“If you’re really stuck you might use the Map. If you’ve had an abnormal tumour I might go to the Map of Medicine to work out what questions to ask next. Occasionally I’d look to see what I need to do, what to examine. I forget things sometimes, so I look it up.” (GP02)

Several GPs stated that they used the Map of Medicine during patient consultations. Some felt that the system suited their style of consultation, and that it was helpful to show the Map to the patient to help them understand the reasons why a particular treatment was being recommended.

“The way I try and use the Map in a consultation would be say, if you’ve got some dispute as to what the treatment should be, the fact that you and the patient look at the same thing is really powerful. So I had one woman, for example, who was very unhappy with her acne treatment. When I printed the Map off for her at least she appreciated I wasn’t being obstructive. It was what the guidance actually was.” (GP05)

However, the decision about whether to use the system in this way would depend on the GP’s perception of the patient’s level of understanding. In some cases the GPs reported that showing a pathway to a patient would be likely to confuse them.

As well as using the system during a consultation, there was one instance where a GP reported using the system in advance of a consultation:

“If I knew a patient was coming in with a certain problem from the previous entry, I’d look at it for my own information so I’d know how to answer their questions or which way the management should be going. The last time I used it, it was for a child. It was suspected cows’ milk intolerance. It was useful. It gave me what I needed to check in the history, and if there were positives or negatives, what tests to perform...” (GP13)

In addition to using the system in relation to the care of individual patients, some GPs described how they used the system outside the setting of a consultation to support their work on designing policies for their own practice or for designing pathways for the whole of the local health community. The need for designing new care pathways was seen as being linked to the need for the NHS to manage in a period of financial constraints.

“We should be doing it because, you know, we should be constantly be doing pathway redesign, shouldn’t we? It’s the only way to move forward without any money around. So it’s silly not to really.” (GP10)

As well as showing the system to patients, the GPs who worked in training practices described how the system was used with trainee clinicians. One GP reported that the most frequent query from Registrars and FY2 Doctors was to ask how to do something, and his standard answer was to tell them to look on the Map of Medicine.

“I use it for teaching both medical students and doctors, in particular the FY2s. I haven’t sort of erm, sat there while they’re playing with it. I send them upstairs and say ‘this is the Map of Medicine, here’s psoriasis, read about it. I’ll be back in an hour. You get your notes ready and present to me’. That’s what I’ve done.” (GP08)

4.7.5 Reasons for not using the Map of Medicine

All of the GPs who were interviewed had tried using the Map of Medicine at some point, but many of them reported that they did not use it currently. A key theme that emerged with those GPs who do not use it was the design, and in particular the pathways format. Some of the GPs described the format as cumbersome and difficult to navigate, and found that it took too long to find the information they were looking for.

“It’s exhaustive. Every possibility is included. It’s so busy with the little lines. So many of them are not what you’re looking for. For a particular condition, you know, the nuts and bolts. You know, turn left here, turn right there. You want to get to this particular scenario. I find it quite difficult to work your way through to get to that branch of the tree.” (GP14)

A small number of GPs had encountered technical problems when they first tried to use the Map of Medicine and had never gone back to try the system again. In the early stages of implementation, the fact that a smart card was required was regarded as a barrier by some GPs. When probed it was found that those GPs who used the Choose & Book system already used a smart card, whereas those GPs who did not use Choose & Book did not routinely use a smart card and found it an obstacle. Other GPs cited the need for a password as a barrier to using the Map of Medicine and once again, when probed, it was found that those GPs who regularly used the NHS Evidence website to access online journals and databases, already had a password that would give them access to the Map of Medicine.

Some of the GPs referred to the lack of training in how to use the Map of Medicine as being a barrier to its adoption. It was stated that, in addition to the demonstrations at the GP network meetings and the distribution of a short user

guide, they felt that they should have been offered one to one training. As well as wanting to know how to use the system, one GP felt he needed to be shown how to use it during a consultation.

“The thing that would have worked better for me, would just being trained in how to use it as a tool in a consultation. I think just being given a way in, rather than just having to explore it from scratch. I would have found that very helpful. The idea of introducing IT into a consultation, I am comfortable doing it if needs be, but it can lead to all sorts of problems so you need some training up in how to do that.” (GP04)

As well as a lack of training, several GPs referred to the time pressure they were under and this was also regarded as a barrier to the adoption of new systems, since it was difficult to set aside enough time to get to learn new ways of working. Several interviewees related how they might have an intention to use e-health systems such as the Map of Medicine, but it was sometimes difficult to fit that in.

“The barrier, I would say, is mainly time. In a busy surgery even if you wanted to look for something, because of the time constraint. You maybe finish the surgery, and think then I’ll look it up, and then something comes up and it slips your mind.” (GP12)

In one case a GP expressed a preference for using paper-based sources of information, rather than online systems, during a consultation. This was due to the speed with which she felt she could find the information that she wanted.

“I will still look up a paper copy of the BNF. I’ll say to somebody “I don’t know the answer to this” so I look in it and share it with them.” (GP10)

Several GPs explained that they did not use the Map of Medicine because they preferred other e-health systems, and because the Map of Medicine did not contain the information they were looking for. For example, in one of the training practices, a GP described how he would use the GP Notebook system for trainees, as he felt the trainees found that system easier to use. Some GPs described how, prior to the introduction of the Map of Medicine, they had found a system that met their information requirements and were reluctant to change without good reason.

“I was really impressed by CKS. When the Map came along my obvious question was how does it improve on CKS? And I’m still not convinced it does.” (GP05)

One GP described how he felt that the concept of the Map of Medicine was based on a hospital model of medicine where the diagnosis has already been made, and that the system did not help in General Practice where the clinician is often faced with ill-defined symptoms.

“In General Practice we see people who may or may not be ill. They’re coming in with symptoms that may or may not be real symptoms. They are

people who are not sure if they are ill. Some people call this the morass of General Practice. There's no medical model that will make a sense of that. Are they at the beginnings of a major condition like cancer, or are they part of the normality? There are no books to help us make that decision. It comes through experience and training.” (GP11)

Another theme that emerged as a reason for not using the Map of Medicine was a concern that, by promoting more standardised ways of working, the system could impinge on the freedom of GPs to act as autonomous professionals.

“Sometimes you can disagree with the guideline and make decisions based on your own experience, which may in time be shown to be right or wrong. But ultimately that's what makes us professionals and not nurses and not robots.” (GP05)

A similar sentiment was expressed by another GP who suggested that his peer group were fearful that systems such as the Map of Medicine would be imposed from above, and that this would be seen as a reason for not adopting it.

“It has to allow for a degree of discretion or judgement, otherwise it becomes too rigid, and therefore not useful. Those are the fears of practitioners, that the Map will be imposed on them and then you won't be able to use it, or it might do some harm, or it could fix guidance.” (GP11)

The other key theme that emerged as a reason for not using the system was the potential trade-off between cost and quality in a period of financial austerity. There was a concern that the system could be used as a means of reducing costs and that, if care pathways on the Map of Medicine were localised, it would be difficult for GPs to be assured that this was not being done for purely financial reasons.

“It lends itself to be tool for saving money, doing things in a second rate way to be honest. And because it lends itself to do that, to get some local variability it would then need a really robust system to say, this is how we know that hasn't happened.” (GP03)

Another GP voiced similar concerns about the way that NHS managers might wish to use the Map of Medicine to promote what they saw as the most cost effective care pathways, but patients would expect their GP to select the optimum care pathway for that patient regardless of the cost.

“It's tricky this because, from a patient's point of view, you'd want the GP you're seeing to give you the best possible care. From a management point of view you'd want the GP to be using care in a cost-effective way. The obvious way to do both those things is to have a prescriptive guideline.” (GP05)

4.8 Community health interviews

4.8.1 Background

In this section the results of the interviews with Community health staff are presented. Interviews were held with 12 staff working in the PCT covered by the case study in order to explore the reasons for the variability in the use of the Map of Medicine and to identify the enhancers and barriers to the adoption of the system. This included clinical staff who were in regular day to day contact with patients, as well as staff whose main role was to manage the delivery of community health services.

4.8.2 Initial engagement

In the interviews participants were asked how they first became aware of the Map of Medicine. The most common methods were through attendance at team meetings, or at meetings of professional networks such as those held at the local hospital. In addition some staff recalled seeing information about the system on the PCT intranet and in emails sent out by the Director of Community Services.

The topic of how people became enrolled as users of the system was explored in the interviews. In some cases the first use of the system followed a discussion with colleagues in the same clinical team or in meetings between Specialist Nurses and District Nurses, or it followed attendance at a wider clinical network meeting where the Map of Medicine had been referred to by GPs and PCT commissioning staff.

Several respondents commented on their first impressions of the system, which varied quite widely. Some reported that they thought it had considerable potential to inform their professional practice, and that it would be relevant to their work. However, it was recognised that it might be difficult to translate that initial enthusiasm into everyday working practice.

*“At the time you think, great I need to do something with this. We should be using it. You get back to the day job and you drop into your old habits. You kind of just fall back into doing the same things that you’ve done before.”
(CH11)*

4.8.3 Factors influencing decisions to use e-health systems

In the majority of interviews, one of the main factors that emerged was the feeling that staff needed to keep up to date with the evidence base in their professional domain.

“These new ideas come out all the time. It’s like the dressings. There’s a new dressing every week. Some are rubbish and some are brilliant. It’s

finding out which ones. To find out information and research you can trust, and know that it's not just research the company's done." (CH07)

A related theme was the concept of information overload. One nurse described how it felt like there was a constant barrage of information about new treatments coming through on a daily basis, and that it was very difficult to keep on top of the flow of information.

The speed and ease of use of a system were considered to be key factors although in comparison to the GPs, the Community staff were less critical about the ease of use of the Map of Medicine. Several staff described it as user friendly, although one of the clinical managers felt that the terminology might be too complicated for users such as Health Care Assistants.

A theme that emerged strongly from the interviews with Community staff was a feeling that they needed to be able to show that they were following evidence-based practice. Both Nurses and Allied Health Professionals described a feeling of constantly needing to demonstrate to medical staff that their professional practice was evidence-based.

"We're always being asked to make sure that we provide evidence-based interventions. So we're always looking for the evidence to back up what we do. So we're kind of used to doing that in a way." (CH02)

The other major theme that appeared to influence the decision about whether to use an e-health system was the provenance of the content.

"Because of the age of the internet, everything's there at the touch of a button. Whether you go to Wikipedia, we know that's not evidence-based, but it still tells you something. We're always going back to something that's government directed and evidence-based because we have to. The GPs would all get sued. So we're going to go back to those sources, aren't we?" (CH09)

4.8.4 Reasons for using the Map of Medicine

As with the GPs, most of the Community health staff interviewed stated that they used a variety of sources of information to support their evidence-based practice, and the Map of Medicine was one of many systems used. The most commonly cited reason for using the Map of Medicine was to review a care pathway and the recommended tests and investigations.

"I have used it on occasions for Cardiac problems. Occasionally we pick up Atrial Fibrillation. It's useful to get an overview. I think, I've tested for that, I've done that. It's really nice to have a sort of ordered treatment plan. If X, then Y and Z. If this happens do that. It's a reassuring clinical framework." (CH12)

In addition to checking the pathway, some respondents reported how they used a system like NICE to look up guidelines but would also use the Map of Medicine to help them to reach a decision about the care of one of their patients.

Another theme that emerged was that certain staff, such as Specialist Nurses and Advanced Practitioners, tended to mainly see patients with similar health conditions. They reported that, although they had used the Map of Medicine when it was first implemented, they did not refer to it frequently as they felt they knew the pathways for their specialist areas. However, they did use the system to look up information about co-morbidities.

“Because we focus on two areas we tend to become more specialised in those areas. But that doesn’t preclude the fact that patients have co-morbidities. They have other conditions that could be interfering with the management we might have in mind. There’s a need to research those parts of the patient’s profile. Again, the Map of Medicine.” (CH06)

Unlike the GPs, many of the Community health staff reported that they used the Map of Medicine to support their interactions with other health professionals, and to show that they were following evidence-based practice. One of the Allied Health Professionals described how she would sometimes send a referral back to a GP if she considered it to be inappropriate, and would include a reference to the Map of Medicine to add weight to her decision, whilst one of the Nurse Practitioners recalled how she might include a reference to the system in a clinical letter.

“I feel I can quote it if, let’s say, if I was writing a clinical letter to somebody. The rationale for my decision, you know, I can quote the Map of Medicine as why I’ve done something. What I suggest. If I’m asking a GP would they consider this? I can quote the Map of Medicine, as I could do NICE guidelines.” (CH08)

4.8.5 Reasons for not using the Map of Medicine

Only one Community health interviewee referred to having experienced technical problems in getting access to the Map of Medicine, and that had been rectified quickly. As with GPs, some users had tried the Map but expressed a preference for continuing to use other systems such as NICE or the BNF and several users stated their first port of call when looking for information would be Google rather than the Map of Medicine. This was partly due to speed, but several users stated that the Map of Medicine did not contain the information they were looking for.

For example, a Podiatrist explained that when the system was first publicised he had been very keen to try it, but was disappointed with the content of the Map of Medicine and regarded it as insufficiently detailed to meet his information needs.

"I have tried it, and I've got no further. I had someone with a specific gait problem. I thought how do I find this? I put in "Steppage Gait" which is this type of walking. I found a little bit, but it basically just said refer to a Podiatrist (laughs)." (CH03)

Similarly, an Advanced Nurse Practitioner reported that she wanted to share some information with a patient, but that the terminology in the Map of Medicine was not suitable.

"One of my ladies is developing a Scoliosis of the spine. She says 'Why is this happening? I said 'it's Scoliosis. I'll Google it.' ... So I've Googled it, so when I see her next week I can give her a better explanation of what it is. So yeah... I've not gone on the Map of Medicine for Scoliosis, because what I want initially is, exactly what it is, what causes that. That's what the patients are likely to ask me in the first instance. The Map doesn't tell you causes, it doesn't help in your explanations with patients.'" (CH09)

Many interviewees reported that they rarely used the Map of Medicine because they were already familiar with the care pathways for the health conditions that they specialised in. One of the Nurse Practitioners compared her own working practice in the Community Health service with her fellow professionals working in General Practice.

"If I was a Nurse Practitioner in a GP surgery I'd probably use it every day.... If I did a morning session in a GP practice I'd probably never be off the Map of Medicine. Whereas in my role, the patients I deal with are not as diverse. I'm knowledgeable. I've got experience of managing a specific group of patients. So it could purely just be down to my experience with that group, that I don't often have to access it." (CH09)

Lack of training was referred to as a reason for not using the Map of Medicine, and although this did not emerge as strongly as it did in the GP interviews a few users reported that they would have benefited from a brief training session to help them find their way around the system. Those users that expressed a need for training also mentioned that with any new e-health system they needed time to become familiar with it. A District Nurse described how the lack of time to become familiar with the Map of Medicine meant that she would fall back on her tried and tested ways of tracking down the information she needed.

"The first time I used it was in connection with a patient. 'Cause of the diagnosis they had, I weren't familiar with. I found it quite difficult to ... but I hadn't used it before, to find my way round things. A lot of information we get from [cancer treatment centre]. We work closely with [cancer treatment centre] and the MacMillan Nurses, so we've always got some source of finding out things." (CH07)

The other main theme that emerged from the interviews with Community health staff was that many of them did most of their work in patients' homes or care

homes, where they had no access to IT systems. The interviewees described how they might sometimes use an online system to look up information before a visit so that they could print it and take it with them, but unlike GPs they relied heavily on handwritten patient records.

4.9 Comparison of the GP and Community Health interviews

One of the major differences between the GPs and Community Health staff was in the language used to describe how they had conceptualised the Map of Medicine. In several interviews with Community staff they talked about their perception that the system had been designed around a medical model, and that it had less relevance to their own professional practice. The Community health staff who were interviewed formed a heterogeneous group spanning several professions, and some respondents argued that the system was of more relevance to specialist staff such as Advanced Nurse Practitioners.

“I think the connotation [of the name the Map of Medicine] is that it could put nurses off accessing the Map. It might put District Nurses off. We’re Advanced Nurse Practitioners so we’re different. If I was a DN would I access the Map of Medicine? No, I think it would probably not offer anything.” (CH09)

In contrast, the GPs did not refer to the design of the system being based on a medical model, apart from one GP who felt that the current design of the system would be more useful to a doctor working in a hospital rather than in General Practice.

A few of the Community health staff referred to the existence of a professional hierarchy, and to the impact this had upon their working relationships with some doctors. A distinction was drawn between what was felt to be a relatively equal relationship with hospital doctors, and a more deferential relationship with some GPs. The feeling that they needed to demonstrate that they were following evidence-based practice emerged as a key theme for Community health staff, particularly in their dealings with GPs, and quoting Map of Medicine pathways in correspondence with GPs was cited as an example by some Community health staff. With GPs, the theme around adherence to evidence-based practice did emerge, but this seemed to be more aligned to their professional appraisal.

There was a marked difference in when the Map of Medicine was used. Several GPs described how they used the Map, and other e-health systems that supported evidence-based practice, during consultations, and this appeared to be most common with those GPs who emphasised the importance of shared decision-making with their patients.

“I did that today with the antibiotic guidelines. A girl came in. I didn’t think it was the right drug. I said “I normally prescribe erythromycin for that”. I said

“Let’s have a look”. We looked, and what she came with was the right drug, but the wrong duration. We looked up the guidelines together, because what I was going to suggest might be in conflict with what she’d been told. So anything I’m not sure of, involve the patient.” (GP06)

In contrast there were few instances where Community health staff used the Map of Medicine during a consultation. When they did use the system it was usually outside the consultation, for example to assist with the planning of a care pathway or to review a pathway as part of the preparation for making a referral to another part of the NHS.

Another difference between the study groups was the theme of time pressure, which came out much more strongly in the interviews with GPs. Several GPs related how they might intend to use e-health systems such as the Map of Medicine, but it was often difficult to fit that into their working day.

There was a marked difference between the study groups in their comments about training. Nearly all of the Community staff stated that that they had been able to use the Map of Medicine without any dedicated training, and one user likened it to doing his internet shopping. In contrast some GPs stated that, in addition to the demonstrations at the GP network meetings and the distribution of a short user guide, they felt they should have been offered one to one training.

The other main difference between the study groups was in their perception of the impact of using the Map of Medicine. In the interviews with the Community health staff the main theme that emerged was about feeling empowered in their dialogue with other health professionals, and in particular with GPs. One of the Nurse Practitioners described how she would refer to the Map of Medicine to make herself sound more professional, although she drew a distinction between the way she might dictate a treatment plan to a District Nurse, and the way she might make suggestions about a treatment plan to a GP. In the latter case she felt it was important for the GP to feel that they retained the decision-making role.

With GPs, the main themes that emerged about the impact of using the Map of Medicine related to improved patient understanding and shared decision-making.

“I think it definitely makes a difference. I think it’s all about involving the patient in their own care. You have to negotiate a care plan together. It allows patients to talk and express themselves erm. Sometimes patients have symptoms they don’t actually feed back to the doctor or the nurse, but when they see something like Map of Medicine “Oh yes that’s me. I do get joint pains”. So it helps the patient to give appropriate information, and it helps the doctor to understand the patient and what’s on their agenda, what their needs are, and what they want.” (GP08)

Although some GPs felt that using the Map of Medicine made the consultation more effective, they did comment that it could also make it longer. However those GPs argued that they felt that they were prepared to trade off the extra time

required as it would usually mean that they were less likely to have a dissatisfied patient. In their opinion the patient would be more likely to tell them if anything had not been covered, and the GP was less likely to make a mistake.

4.10 Unexpected findings from the interviews

In the meso level interviews it was reported by some of the NHS senior managers that one of the reasons for clinicians not adopting the Map of Medicine was that the system was regarded as part of the NHS National Programme for IT and that this carried negative connotations. This issue was explored in the micro level interviews. In all of the interviews with Community health staff the connection to the NPfIT was not regarded as an issue, and in the interviews with GPs only one person stated that the fact that the Map of Medicine was part of the NPfIT had made any difference to their initial engagement. Even in that case, the respondent made a distinction between the way they felt that the Choose & Book system had been imposed on GPs, and what they regarded as a less directive approach that was taken with the Map of Medicine.

Before the fieldwork began, one of the possible explanations offered by NHS senior managers for the variability in the use of e-health systems was the age of staff. It was suggested that older NHS staff were less likely to use technology such as tablets and smart phones in their personal lives, and that they would probably be less likely than younger staff to use e-health systems such as the Map of Medicine. However the results from the quantitative phase of the project showed that for GPs there did not appear to be any relationship between age and level of use. The results from the online survey of Community health staff had indicated that younger staff were slightly less likely to use the Map than their older colleagues, which was unexpected. Although the findings did not match the hypothesis put forward by NHS senior managers that older staff would be more reluctant to adopt new e-health systems, this is consistent with the published research which indicates that there is no simple direct correlation between age and use of technology. For example Friedberg (2001) suggests that the rate of computer use is similar between age groups for all but the very oldest workers, and that in most situations workers will acquire the skills that are needed to perform their work role. She reports that the key factor that influences the attitude of older workers to adopting new technology is impending retirement rather than age per se. Similarly Morris and Venkatesh (2000) argue that there is no simple causal relationship between age and the acceptance of new technology. They suggest that some older workers may require reassurance in becoming familiar with new technologies and in feeling confident about its use, but that where organisations encourage continuous learning for their employees the anxieties experienced by those older workers tends to diminish.

This issue of age was explored in the interviews with GPs, and it appeared that some of the keenest users of the system were recently qualified GPs who had been encouraged to use the system when they were GP trainees, or they were

GPs who were near retirement age, were working as locums, and wanted to ensure that they kept their skills up to date.

“Things change dramatically in medicine It still is important that I do the right things. I’ll use the Map of Medicine now, wherever I am I’ll be able to access the pathway. So actually, I think it’s got more use to me now than it did then.” (GP09)

In the interviews with Community health staff the apparent paradox that younger staff were slightly less likely to use the system was explored. Some respondents felt that this was understandable because younger staff were likely to seek information about evidence-based practice from the more experienced staff, rather than searching online systems.

“For the younger ones, they’re finding their feet in terms of their practical skills. They’re obviously getting direction from the older, more experienced members of staff. That sort of mentorship happens post-qualification. There’s that dependence on the senior staff to guide them. I think it’s only when they feel they get the need to look at another area or they want promotion, at that point they start to consider more.” (CH06)

It was also argued that in Community care settings the younger staff were likely to be working in relatively junior positions and would have less autonomy in their day to day work, whereas older staff were more likely to be involved in the development of local policies and guidelines which would require them to search for information about evidence-based practice.

4.11 Summary

This chapter describes the main findings from the quantitative and qualitative phases of the study. The results from the online survey revealed that slightly over half of the GPs and just over a quarter of the Community health staff in the study population reported using the Map of Medicine, and showed a marked difference between the study populations in terms of frequency of use.

Both GPs and Community health staff made similar use of the system during a consultation, with the most common reasons being to review the recommended care pathway or to look up information about a rare clinical condition. Those were also the most common reasons for using the system outside a consultation.

A number of reasons were given for not using the system, and those responses were used to inform the design of the interview guide that was used for the qualitative phase of the study.

This chapter has also described the main findings of the qualitative phase of the study. The results from the macro and meso level interviews with staff from the

Department of Health, Strategic Health Authorities and the system suppliers, and the micro level interviews with GPs and Community health staff have been presented. The reasons why the Department of Health decided to invest in the Map of Medicine on behalf of the whole of the NHS in England have been reviewed, and some of the discrepancies between the high level aims of the national, regional and local levels of NHS management have been considered.

The findings from the micro level interviews have been presented and these help to provide a rich picture of how GPs and Community health staff use the Map of Medicine, and other similar e-health systems, as part of their everyday working practice. The reasons why NHS staff use, or do not use, the Map of Medicine and the main differences between the responses from GPs and Community health staff have been discussed.

In the next chapter the findings from the study are discussed in relation to the previously published literature about the evaluation of e-health systems.

Chapter 5 - Discussion

“The trouble with the world is that the stupid are cocksure and the intelligent are full of doubt”. Bertrand Russell (Wikiquote 2013c).

5.1 Introduction

The above quotation is intended to illustrate the dilemma faced by those who seek to evaluate the implementation of IT systems in healthcare. The literature indicates that there are often considerable differences between the categorical statements made by politicians and senior managers about the predicted success of e-health initiatives and the experience of healthcare staff working in the field.

The main findings from the quantitative phase of the case study were that although the project to implement the Map of Medicine was considered to have been completed by the local NHS senior managers, only about half of the GPs and a quarter of the Community health clinicians reported using the system, and many of those did so relatively infrequently. The interviews revealed some significant differences between the two study groups in terms of the reasons why they did, or did not, use the system. The findings indicate that, for the local health community covered by the case study, the Map of Medicine has failed to become embedded as part of normal working practice for a significant proportion of GPs and for the majority of Community health clinicians.

This chapter discusses the findings of the study in relation the literature already published about the evaluation of e-health systems, and in relation to the literature about the success or failure of e-health systems.

5.2 Interpreting the findings

In the Methods chapter it was noted that although this was a mixed methods project, the primary focus relied on a qualitative approach. Whereas a predominantly positivist approach would rely on the principle of there being a single version of reality that can be measured, an interpretive approach is based on the principle that social phenomena can have multiple interpretations and that the researcher should identify those versions of the “truth” (Greenhalgh and Russell 2010, adapted from Klein and Myers 1999). In this project there is therefore a deliberate attempt to expose those different versions of the truth and to uncover issues about power relationships and the dominance of certain professional groups.

Similarly while a positivist approach would aim to minimise bias through research designs such as randomisation, an interpretive approach is based on the principle that the researcher should be reflexive about their own background and preconceptions, and that issue is addressed in the reflective commentary.

One of the other key differences is that while a positivist approach would typically be based on the idea that findings should be generalisable, due to the fact that the research has been based on a sample that is statistically representative of the population it has been taken from, an interpretive approach is based on the idea that findings can be generalised by relating them to a theoretical framework (Greenhalgh and Russell 2010). The question of whether case study approaches can be generalised, or can only provide conclusions that are context-specific, has been the subject of debate. Popay et al (1998, p.348) argue that the aim of qualitative research is “*to make logical generalizations to a theoretical understanding of a similar class or phenomena rather than probabilistic generalizations to a population*”, and the authors go on to state that it is not essential for cases to be typical in order for generalisations to be made. A similar point about generalisability is made by Takian et al (2012) who argue that when following a qualitative approach, instead of employing positivist concepts such as sampling and statistical significance to make the findings generalisable, we should use concepts such as contextualisation, depth of study and critical reflection.

5.3 The sociotechnical networks

In section 2.8.4, where the Connecting for Health Evaluation Programme was discussed, it was noted that in the evaluation of the Summary Care Record, Greenhalgh, Stramer et al (2010a) had conceptualised the programme of work to implement the Summary Care Record as a complex sociotechnical network with five different worlds: political, clinical, technical, commercial and patients. In this case study a similar sociotechnical network was identified (see section 3.5) which spanned political/managerial, clinical, technical and commercial worlds. There were differences in the norms, priorities and expectations between the people involved in those worlds, and those differences were always likely to make the sociotechnical network unstable over time. Although the various parts of the network are influenced by each of the others, it is worth giving some consideration to each of the separate networks.

5.3.1 The political and managerial world

In the political and managerial world, the implementation of the Map of Medicine was conceived as a project that formed part of a very large programme, the NHS National Programme for IT. The language used by NHS senior managers during the face to face interviews was characterised by expressions such as “return on investment” and there was pressure to identify financial savings that could be attributed to the use of systems such as the Map of Medicine.

From the analysis of documents that were made available to the researcher it was apparent that the managerial approach to the implementation of the Map of Medicine was strongly influenced by the Department of Health requirement for NHS organisations to use an approach called the PRINCE 2 methodology to manage large projects in general, and the NHS National Programme for IT in particular. The methodology involves a rationalistic approach to the planning of projects, where tasks are broken down into discrete work packages, and has a strong focus on documentation and on management reporting. However, such a rigid approach was likely to be difficult to apply across a complex sociotechnical network.

This approach can be viewed in the context of the conceptual bases for spread of innovation as set out by Greenhalgh, Robert et al (2004). The authors defined a “Let it happen” approach as one that was adaptive and emergent and compared that with a “Make it happen” approach that took a scientific, orderly approach that was carefully planned by managers. In the project documents and also in the interviews at DH and SHA level, there were very clear indications of a “Make it happen” approach.

“It was the managerial commitment that made it happen. If we didn’t have that it would have grown organically from the bottom up. It’s not the only project where we tried to drive it from the SHA level, PACS, digital dictation, where we’re really pushing organisations and helping them to understand the costs and benefits. Where we’ve made that commitment managerially and invested, if we drive it the benefits will come quicker than if we let it happen organically.” (MM03)

Similar comments were made in another interview where the SHA in question had taken a deliberately planned approach to the implementation of the Map of Medicine.

“There’s something about an SHA role as they are about to be abolished. It would make an interesting study about the regional approach here to make it happen and you could compare it with other regions where they just let things happen. (MM05)

In the interviews with NHS senior managers at both national and regional level it was apparent that the managerial world was particularly susceptible to the upheaval and uncertainties caused by the change of government following the general election in 2010, the criticism of the NHS National Programme for IT by Parliamentary Committees (House of Commons Committee of Public Accounts 2007, 2009, 2011) and by Ministers in the incoming coalition government (BBC News 2013), and by the abolition of SHAs and PCTs following the passing of the Health and Social Care Act 2012. It proved difficult to gain access to some of the key decision makers at national level, and when interviews were held there was a notable reticence to discuss concepts such as success and failure.

5.3.2 *The clinical world*

The clinical world observed in the case study was characterised by norms and values that were typical of professions. In the interviews with clinicians there were frequent references to the need to follow best clinical practice as defined by their own professional body, and the community staff referred to the need to be seen by commissioners to be following evidence based guidelines. Some interviewees referred to a need to keep up to date with developments in their own professional domain, to behave with integrity, and to do their best for their patients. In the interviews with GPs there was also a strong theme of being responsible for training the next generation of clinicians.

The increasing emphasis on evidence based practice can be seen as part of a move away from a largely intuitive approach to the practice of medicine, towards one that is characterised by an emphasis on the standardisation of clinical pathways and the use of structured guidelines. For example Harrison and Wood (2005) refer to the development of scientific-bureaucratic medicine, which is based on the assumption that accumulated research evidence should form the basis of clinical guidelines which in turn can be enforced to manage the demand for NHS services.

The debate about structure and agency is relevant to the clinical world, where the members of the various health professions can be viewed as being part of a negotiated order where doctors are usually dominant over other staff. In their study of interprofessional relations in health care Nugus, Greenfield et al (2006) argue that doctors are socialised through organisational and cultural structures to see their role as making key decisions about patient care and to constrain the input of non-doctors. Svensson (1996) suggests that the interplay between doctors and nurses can be understood using a negotiated order perspective to explain how actors can exercise agency to resist power structures, whilst at the same time those structures provide the framework for the actors concerned to make choices.

The fieldwork covered a period when Clinical Commissioning Groups (CCGs) were being set up to take over the commissioning of health services from the PCTs which were to be abolished. The case study revealed a tension between the micro level where actors were engaged in cognitive participation with the Map of Medicine and the meso level where the organisational structures and norms of the PCTs and emergent CCGs came into play. Some of the interviews were with GPs who had a dual role as clinicians working in a General Practice and also as members of the CCG board. Those clinicians expressed concerns about a dichotomy between the personalised practice of medicine within their own surgery, and the growing emphasis on the standardisation of care which could be implied by the promotion of the use of the Map of Medicine and other similar e-health systems. At the meso level those GPs were expected to work within the PCT and CCG organisational structures, to be held accountable to the organisation by reporting back to committee meetings and to conform to the norms of behaviour as set out in PCT and CCG job descriptions.

5.3.3 The technical world

The technical world of the case study was characterised by norms and values such as functionality, which was judged against the ability of the system suppliers to match the requirements as originally set out in the Output Based Specification, and practicality and ease of use which could be measured in terms of the efficiency of the search tools in locating a desired item of information and the time taken to log in to the system and to retrieve information.

There was also a technical world in the local NHS organisations, as there were a number of technical tasks that needed to be undertaken to ensure that clinicians in primary and community care settings were able to access the Map of Medicine system from the computers in their workplace. The technical world featured strongly in the project documentation that was made available to the researcher. The notes of Project Board meetings reflected a strong focus on technical tasks such as software configuration and installation, on creating and issuing smart cards to end users, and on the technical roles to be undertaken by local NHS staff to ensure that the care pathways published on the system could be customised to reflect local NHS practice. This technical emphasis was also apparent in the meso level interviews.

“There was a list of projects it was mandatory to implement, and the Map was seen as an IT implementation project where we were responsible for ensuring that users could access the software” (MM02)

The project documents also reflected a strong focus on governance arrangements with frequent and detailed references about accountability to the main Programme Board, but there was much less emphasis on engagement with end users.

5.3.4 The commercial world

In the commercial world inhabited by the system suppliers the norms and values encountered were those that are typical of private sector organisations. Businesses operating in this world tend to focus on delivering a service to their customers, on ensuring that customers regard their products as delivering value for money, on remaining ahead of their competitors, and on delivering a return on investment for their shareholders.

During the interviews it became apparent that there were tensions in the evolution of relationships between the various system suppliers and NHS Connecting for Health.

“The needs of the NHS changed over time, and always will with such long contracts. There needs to be a way to renegotiate, not always financially, what’s needed.” (MM12)

In the part of England covered by the case study, the contract for the Map of Medicine was between NHS Connecting for Health and the Computer Sciences Corporation (CSC) which was the Local Service Provider (LSP) under the NHS National Programme for IT. The supplier of the Map of Medicine system was a sub-contractor to the LSP and there was therefore no direct contractual relationship between the supplier of the Map of Medicine and the NHS organisations that were the intended users of the system. Due to this contractual complexity, when changes to the system were requested by NHS organisations, those requests had to go through a multi-layered governance process, which led to frustrations for both the system users and the suppliers of the Map of Medicine system.

“It’s been a painful learning process. We’re contract compliant but we can easily be side swiped by a clinician’s comments.” (MM09)

5.4 Assessing success and failure

One of the most striking findings of the study was the lack of clearly defined success criteria for the implementation of the Map of Medicine in the NHS in England. Although the Welsh NHS did develop a business case which set out the benefits that were expected to be realised from implementing in NHS organisations in Wales (Informing Healthcare 2008), the macro level interviews with staff from the Department of Health and NHS Connecting for Health failed to elicit any clear success criteria, or any national set of metrics that were intended to be used to monitor progress in terms of implementation.

In terms of the evaluation of e-health systems this is far from unique and, as Greenhalgh, Stramer et al (2010b) reported in their final report of the evaluation of the NHS Summary Care Record, there is rarely a universally agreed set of metrics for assessing success due to the fact that large IT programmes have social and political dimensions, and claims about the success or failure of those programmes are likely to be contested by the various stakeholders.

In the SHA that included the site of the case study, a set of metrics had been developed to monitor progress in terms of implementation. These were mainly process measures, such as whether there was a project manager in post, whether a clinical governance process had been agreed for signing off localised pathways, and whether any awareness raising events had been held. Nevertheless, in the opinion of that SHA, the Map of Medicine had either become part of normal business and was delivering some benefits, or was well on the way to becoming normalised in two thirds of the 24 PCTs. However, there was no explicit definition of what those benefits were, or how they were to be measured.

In a second SHA it was found that there had been an attempt to define the benefits that were expected to be realised from implementing the Map of Medicine, and an extract from that document is included in Appendix 13. For example, one of the anticipated benefits was that clinicians in primary and secondary care would save

time and effort by not having to synthesise the vast array of clinical guidelines and published research, and this was to be measured by a survey of clinical users of the system. Another anticipated benefit was that patients would receive information from the Map of Medicine, that this would increase patient understanding about their diagnosis and treatment, and that this would reduce the chances of patient non-attendance or non-compliance throughout the patient journey. This was to be measured through patient satisfaction surveys. However, the SHA in question never got as far as undertaking the surveys that were alluded to, so it was impossible to assess whether those potential benefits had been realised.

In the PCT covered by the case study, implementation of the Map of Medicine was managed by the Programme Office for the NHS National Programme for IT. As described in section 5.3.1, the implementation was managed using the PRINCE 2 project management methodology, and a set of metrics was developed to monitor progress. However, those metrics were mainly focused on technical aspects, such as whether the software had been installed on the computers used by the GPs and Community health clinicians, whether user accounts had been created and whether the local IT Service Desks were ready to support users, or process measures such as whether training materials had been prepared and publicity material had been published on the PCT web site. At both SHA and PCT level there were no metrics about whether the system was actually used by the NHS staff who were the target audience.

In the Literature Review it was noted that different stakeholder groups, such as managers, doctors, nurses and other health professionals, are likely to define concepts such as success and failure in different ways. Berg (2001) and Heeks (2006) argue that those concepts have several dimensions; for example success could be measured in terms of efficiency, effectiveness or user satisfaction. As well as having several dimensions, it is likely that stakeholders will disagree about which dimension is the most important. Senior managers might define success as a project being implemented within budget or the system being implemented within a predefined timescale, whereas clinical governance leads might define success in terms of levels of satisfied users of the system. What emerges from the documentary evidence and from the macro and meso level interviews is that the implementation of the Map of Medicine was regarded by CfH, the SHAs and PCTs as being mainly successful. This was justified on the grounds that the managerial and technical tasks defined in the PRINCE2 project management documentation had been completed, but no attempt had been made by CfH, the SHAs or PCTs to assess whether the health professionals who were the target audience for the system had ever used it.

It has been suggested by some commentators (Heeks, Munday et al 1999, Dalcher and Drevin 2005, Wears and Berg 2005) that there is a publication bias in terms of evaluations of e-health systems. They suggest that health informatics conferences tend to focus on successful e-health initiatives, that system failures often go unreported, but that much can be learned from those failed e-health initiatives.

Heeks, Munday et al suggest that that partial failure can be further broken down into “*sustainability failure*” where an initiative succeeds initially but falls into disuse, and a “*replication failure*” where an initiative succeeds in a pilot location but the success cannot be repeated elsewhere. The interviews with senior managers from different SHAs did indicate that replication failure was a useful concept, as the SHA managers reported what they regarded as successful implementations in pilot local health communities which they were unable to replicate in other locations. The concept of sustainability failure could also be recognised in the PCT that was the site of the case study, where the initial level of interest from GPs in the Map of Medicine diminished after the dedicated project resources to support user awareness and training were withdrawn and diverted to the next NPfIT project that was in the pipeline.

Another aspect that merits consideration is the epistemological lessons that arise from the different methods that could be used to evaluate e-health systems. Takian et al (2012) have critically reflected on the longitudinal evaluation that was undertaken of the implementation of the NHS Care Records Service. The original intention had been to use a comparative before-and-after methodology that would attempt to measure achievement against predefined criteria and project milestones, but this changed to an interpretive approach that provided a rich picture of local implementations and “*sought to tell the whole story not just the ending*” (p.7). The authors argue that a mainly interpretive approach was particularly suitable to capture the processes that occur, (such as changes to working practices, adapting technologies and adopting workarounds), and that this can be just as useful as the outcomes associated with more traditional evaluations.

5.5 Research findings in context

In this section the findings from the thesis case study are compared with the findings from similar research projects which have studied various aspects of the NHS National Programme for IT.

5.5.1 Other research on the Map of Medicine

The findings from the thesis case study can be compared with the findings of a research project by Brennan and Mattick (2010) which studied the use of the Map of Medicine by clinicians working in the south west of England. The most important finding from their research was that the two main factors that influenced the decision by clinicians about whether to access an e-health system such as the Map of Medicine were the speed of accessing the system and the ease of use. The authors argued that their results were consistent with the findings from other similar studies of the information seeking behaviour of doctors (Davies 2007, Bennett et al 2004). Another key theme from the Brennan and Mattick study was a marked resistance to using online systems that were password protected, or required a smart card to gain access. They argued that when users such as GPs are under

time pressures, being required to remember a password and to then have to go through some sort of logging in process was a barrier to the adoption of an online system.

Those key factors also emerged in the thesis case study, although speed of access and ease of use were two amongst many factors cited by GPs as factors that appeared to influence their decision about whether to use an e-health system. In the thesis case study, several GPs referred to the constant time pressure they felt they were under, and that how long it took to gain access to any e-health system would influence whether they chose to use it. The need to use a smart card was cited as a barrier in the Brennan and Mattick study, but was less of an issue in the thesis case study. This is probably due to the fact that, by the time of the thesis case study, GPs had the option to access the Map of Medicine using their NHS Athens password, thereby avoiding the need to use a smart card. However in the thesis case study, some GPs routinely used a smart card to access the Choose and Book system and those GPs did not regard the need to use a smart card as a significant obstacle to using the Map of Medicine.

A factor that emerged more strongly from the thesis case study than the Brennan and Mattick study was the provenance of the content of the various e-health systems that were available to GPs. Although many GPs did refer to ease of use as being important, their decision about whether to use a particular e-health system and when to use it was a complex one and depended on the context of their work. Some GPs put considerable emphasis on the importance of using systems, such as the NICE website, that were officially sanctioned by the Department of Health or the relevant professional body such as the Royal College of Physicians.

“NICE, the Map of Medicine and BNF are officially sanctioned, so if you’re using it to justify what you’re doing you’ve got more weight. It’s more justifiable.” (GP07).

The content of the Map of Medicine did seem to be trusted by GPs, indeed some of them stated that they regarded it as being at the same level as NICE, and this was compared to the material from the internet that patients would bring to the consultation.

“I think it makes it a little bit more acceptable to GPs who realise there’s so much stuff out there. The stuff patients print from Google. Good God! The stuff, the rubbish you get (laughs). So it’s good if it’s got an official stamp.” (GP09)

However, some of the GPs who did not use the Map of Medicine reported that they had not adopted it because they had become accustomed to using other e-health systems before the implementation of the Map of Medicine, and were reluctant to change without good reason.

In the Brennan and Mattick study the majority of research participants reported that they had accessed information resources during a consultation, although there were a small number of participants who preferred not to do this as they felt it might cause the patient to think that there was a gap in their knowledge. They cite a study by Weaver (2003) of the patient perspective of the use of various information sources during a primary care consultation, which found on the whole that patients reported having greater confidence in the care and advice offered by health professionals who made active use of information resources.

In the thesis case study the theme of patient confidence in the doctor did emerge in the interviews. The majority of the GPs who were interviewed felt that most of their patients understood that the doctor could not know everything, particularly working as a General Practitioner where they could be faced with treating almost any clinical condition. Some of those GPs felt that it increased the confidence of patients if they admit that they are not sure about something and look it up with the patient, rather than pretending to know everything. One GP described that approach as being a fantastic leveller, and considered that it led to a better informed conversation with the patient. However a small number of GPs reported that looking something up on the computer during a consultation was likely to instil a lack of confidence in the patient.

“I get feedback from patients. They sometimes see it badly. I can give you an example. A relative of mine went to see their local doctor. He said “I had to go for a fungal nail infection, and he had to look it up on the internet to see what the treatment should be”. You know (laughs). It just gave a bad impression, because the doctor didn’t really know so he had to look it up.”
(GP14)

5.5.2 Research on the Summary Care Record

The findings from the thesis case study can be compared with those from the research into the NHS Summary Care Record which was undertaken as part of the CfH Evaluation Programme (Greenhalgh, Stramer et al 2010a, Greenhalgh, and Stramer et al 2010b). This was a mixed method, multi-site case study which attempted to build a rich and contextualised picture of a complex process of change. One of the main themes that emerged from this study was that there were multiple stakeholders in the Summary Care Record programme, and that each of these had different expectations of the programme. Despite the significant investment of resources, this study found that at most sites clinicians rarely used the system. This was for a variety of reasons including the opposition of local opinion leaders such as the Local Medical Committee, use of the system not being promoted by the host organisation, lack of training or motivation on behalf of the clinicians, and technical issues such as problems with smart cards or passwords. The fact that the system was not adopted in secondary care was also partly explained by the fact that the clinician would need to exit one software application and open another to access the Summary Care Record, and there were spatial

challenges in accessing the system in real time from a computer that was physically distant from the cubicle where the patient consultation was taking place.

There were parallels in the thesis case study, where several stakeholders were identified with different expectations about the benefits of using the Map of Medicine. The findings from the qualitative phase, and particularly the interviews with Community health staff, revealed that one of the reasons for the non-adoption of the Map of Medicine was the fact that many of their interactions with patients took place in patients' homes or in care homes where they had no access to IT systems. There were also some other similarities from the interviews in terms of some GPs complaining about lack of training and finding the need to use a password being a barrier, while some Community health staff explained that they rarely used the Map of Medicine because use of the system was not actively promoted by their line managers.

5.5.3 Research on Electronic Health Records in secondary care

The findings from the thesis case study can also be compared with those from the research into the implementation and adoption of Electronic Health Records (EHRs) in secondary care which was undertaken as part of the CfH Evaluation Programme (Robertson et al 2010a). This was a mixed methods multi-site case study evaluation, and was designed to be a before and after evaluation at 12 hospital trusts across England. One of the major themes that emerged from this study related to the difficulties encountered due to the top down nature of the approach taken by the Department of Health, which was in part a response to the perception that NHS IT systems had made slow progress prior to the establishment of the National Programme for IT. The study by Robertson et al also reported a number of adverse consequences of having contracts that had been negotiated by central government, so that there was no direct contractual relationship between the NHS hospital trusts that were the users of those e-health systems and the suppliers of those systems. The study reported that respondents frequently complained about convoluted lines of communication involving the hospitals, NHS Connecting for Health and the Local Service Providers, and there was frustration about the long lead in times to deal with requests to fix problems with the software or to deliver agreed developments.

This was echoed in the thesis case study, where some of the NHS senior managers expressed frustration about the fact that there was no direct contractual relationship between the NHS and the suppliers of the Map of Medicine application.

“We’d have liked more information about usage, so we could prove if it was being used. But that wasn’t included in the contract.” (MM03)

Any requests for change had to go through a lengthy and bureaucratic approval process, which meant that it took a long time for those system changes to be delivered to front line NHS staff who were the users of the system.

5.5.4 Research on Electronic Health Records in a Mental Health Trust

Eason (2007) evaluated the implementation of an electronic health records system in a Mental Health Trust using a sociotechnical approach. He found that there were several reasons for the partial adoption of the system, but the biggest barrier was the fact that the assumptions made by the system suppliers about how health professionals work with their patients were out of step with actual working practices. For example the system assumed that a patient would have no further contact with the service after being discharged, unless they were readmitted. In fact patients with long term conditions would often come to see the health professionals without a formal referral.

A significant barrier in the study by Eason was training. The relatively high turnover of staff, and high number of part time staff and people on short term contracts made it difficult to correctly identify who needed training and then to ensure it was delivered. This was echoed in the thesis case study where the lack of training was cited as a barrier to the adoption of the system. In addition, the fact that the project implementation team was stood down shortly after the system was first implemented meant that there was nobody available to assist users with queries about the system and help its use become sustained and embedded as part of normal working practice.

5.5.5 Research on Choose and Book

Since 2006 the Choose and Book system has been a key feature of national NHS policy on providing patients with choice about when and where they receive treatment. The initiative has been actively promoted through the NHS management structure from that date as a means of empowering patients through offering choice (Choose and Book 2013), although commentators such as Bate and Robert (2005) have suggested that the offer of choice may confuse some patients and even cause anxiety, and question whether patients can judge whether hospital or consultant A is better than hospital or consultant B. The authors cite a patient survey carried out by *Which?* Magazine where 89% of respondents agreed that access to a good local hospital was more appropriate than having more hospitals to choose from.

In order to encourage GPs and their staff to use the Choose and Book system financial incentives were provided and this did appear to encourage use of the system. However those financial incentives have been withdrawn and there is evidence that the level of use has now diminished. For example, Barr (2012) cites DH statistics indicating that the level of use in Hertfordshire fell from a high of 60% to 35% and in Bedfordshire from 53% to 27%.

Green et al (2008) have investigated whether Choose and Book has delivered choice to patients and concluded that despite the optimistic tone of case studies published on the NHS Choose and Book website, the patients in their study did not feel that they were exercising much choice. The authors suggest that this is hardly surprising given the asymmetric relationship between many doctors and patients, where the patient may prefer the choice of treatment to be made by someone they regard as better informed to make the decision on their behalf.

Research on clinicians' views about the impact of Choose and Book (Rabiei et al 2009) found that GPs identified a number of benefits that Choose and Book had the potential to deliver, but there were also a number of negative aspects from using the system. For example the GPs interviewed felt that the system had the potential to shorten waiting times for patients and the system could enable the GP to follow the progress of a referral, but on the negative side the system tended to make consultations longer, it was often not straightforward to choose the appropriate clinic and several users found the log-in process cumbersome due to the need to use a smart card.

There were similar findings in the thesis case study, where interviewees recognised that the Map of Medicine had the potential to be useful but in practice found that the need to use a smart card could be a barrier to the system becoming adopted. A negative aspect in the Rabiei et al study was the feeling of some GPs that choosing and booking clinics was an administrative task which should be delegated to administrative staff in the practice, whereas in the thesis case study the system was seen to have a good fit with the work of GPs and community health clinicians.

A further similarity between the Choose and Book implementation and the thesis case study was the disparity between the optimistic tone of case studies published on the DH and system supplier websites and the experience reported by system users in interviews.

5.6 Application of Normalisation Process Theory to the case study

In this section the results of the case study interviews are reviewed using the constructs of Normalisation Process Theory. Figure 6 shows the various components of NPT and how they interact with each other.

The NPT concept of Coherence was used to consider how the introduction of the Map of Medicine was first received and how potential users conceptualised it and made sense of it. In section 4.6.2, which refers to the interviews with people working at the national level of the NHS, it became evident that there was no explicit business case for the Map of Medicine, there was no clear statement of the objectives that the system was intended to support, and no criteria for judging the success of the implementation of the system. As well as there being no business

case, the researcher was not permitted access to the contract between CfH and the system supplier, so it was not possible to cross reference those interviews with documentary evidence. However, the national level interviews did reveal some disparity between the emphasis that some of the participants placed on the system being a tool that had the potential to enable NHS clinicians to avoid being overwhelmed by poor quality information and to find the knowledge they need, when they need it, whilst others appeared to regard the Map of Medicine as a relatively minor component of a much bigger programme of work.

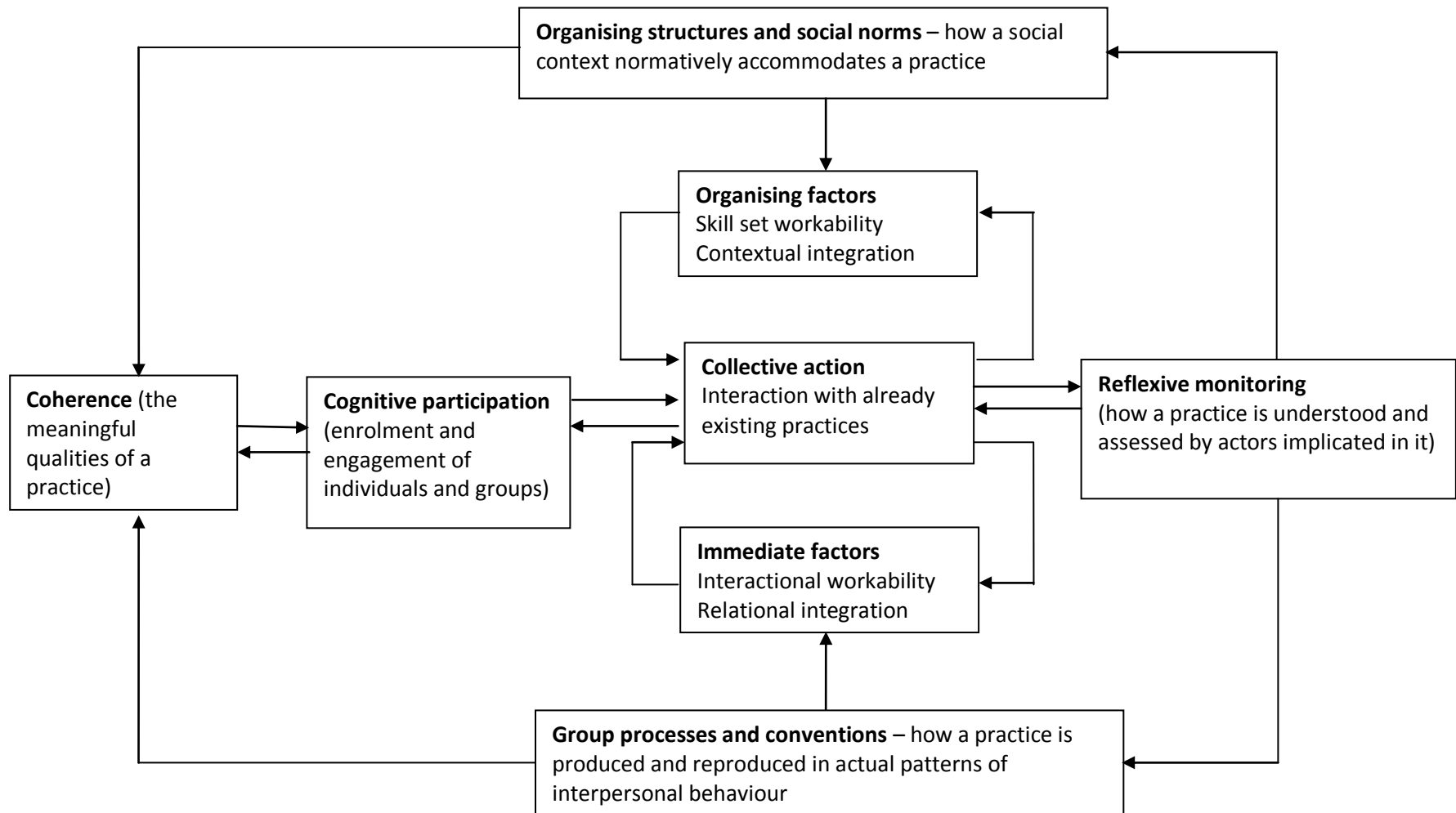
In section 4.6.3, which refers to the interviews with people working at SHA level, it was evident that although the Map of Medicine was originally conceived of as a system to support evidence-based practice, that focus changed to it being thought of as a system that would enable the NHS to achieve cost savings. The absence of any clear objectives at national level led the SHAs to develop their own success criteria, although these tended to focus on process issues rather than on outcomes, and it was apparent that some of the SHA senior managers viewed the Map of Medicine as primarily an IT systems project rather than as being about a project to support evidence-based practice.

Section 4.6.5, which refers to the interviews with system suppliers, also reveals some aspects of Coherence. The system suppliers were clear that the system was intended to offer guidance about evidence-based practice rather than being prescriptive, and that it was important to recognise that individual clinicians needed to exercise their judgement about whether the recommended care pathway was suitable for a particular patient.

The ways in which GPs and community staff made sense of the introduction of the system emerged strongly in the interviews. For example in section 4.7.5, which refers to reasons for not using the system, one of the GPs talked about how the system could impinge on their freedom to act as autonomous professionals and commented that “*we are professionals and not robots*”. Another GP talked about his fears that the system being imposed from above and not allowing for the application discretion or judgement, whilst a different GP referred to the system being used by NHS managers as a tool to save money and to “*do things in a second rate way*”.

The NPT concept of Coherence was therefore useful in considering how the various stakeholders made sense of the Map of Medicine, and in understanding the differences in how the system was conceptualised by those respective groups and how those differences might have contributed to the extent to which the use of the system became normalised.

Figure 8. Model of the components of Normalisation Process Theory



From May and Finch (2009)

The NPT concept of Cognitive Participation refers to how individuals and groups become engaged and enrolled. In section 4.7.2 the process of initial engagement was considered and it was clear in the case study that, although the project management team had sent out communications about the Map of Medicine and had organised a formal launch of the system, this had had a very limited impact on GPs.

Although the launch event was aimed primarily at GPs, the vast majority of the 100 people who attended were Community health clinicians and NHS managers. The most important factor in terms of Cognitive Participation for GPs appeared to be communication within their own peer group, and several interviewees referred to the role played by two particular GPs who were regarded as keen advocates of the Map of Medicine. The other key factor was the discussion about the Map of Medicine that took place at the “Target” meetings, which is a protected learning time scheme for GPs.

For the Community health interviewees the key factors in terms of Cognitive Participation were slightly different. The formal management networks did seem to have some influence and interviewees referred to their initial awareness being triggered through emails or news items on the intranet, although the ways in which they conceptualised the Map of Medicine were influenced by attending meetings of their own clinical teams and through discussions with other Community health clinicians.

The GPs’ Target meetings and the Community health clinical team meetings can be seen in the context of the *Group processes and conventions* element of NPT (May and Finch 2009, p.541), whereby practices are produced and then reproduced in interpersonal behaviour. It was evident that how some of the Community health staff made sense of the system was influenced by discussions with GPs, but there were no references by GPs to being influenced by Community health staff which might be indicative of their relative position in the professional hierarchy.

The NPT concept of Skill Set Workability refers to the fit between the new technology and existing skill sets, and was evident in the qualitative phase of the case study. In the interviews respondents described how they used a variety of information sources to support their evidence-based practice, and the Map of Medicine was often one of many sources used. In the research by Murray et al (2011) it was reported that the Choose and Book system failed to become normalised amongst GPs due in part to the fact that it was perceived as requiring a clinician to undertake clerical work. In the thesis case study, the Map of Medicine was perceived by many GPs as having a good fit with their skill sets. However, whether it became normalised appeared to depend on whether they perceived the system as being better than other systems that they had previously used to support their evidence-based practice. In one of the GP interviews the respondent felt strongly that the Map of Medicine was designed from the perspective of hospital doctors. He argued that they tend to deal with well defined clinical conditions,

whereas in General Practice doctors were often faced with ill defined symptoms that may or may not be indicative of something serious.

In the interviews with Community health staff there was a rather different attitude to Skill Set Workability. Some interviewees referred to the Map of Medicine as being designed for doctors rather than for nurses or allied health professionals, although participants such as the Advanced Nurse Practitioners considered that the system was a good fit with their professional skills, for example to enable them to check that they had undertaken the relevant tests that formed part of the recommended treatment plan for a given clinical condition. This is consistent with the findings of a study using NPT to explore the potential of telehealth by Godden and King (2011) who found that Skill Set Workability could be an important factor in normalisation, provided that the necessary resources were provided for staff to acquire the necessary skills.

The next NPT concept that emerged in the qualitative phase of the study was Contextual Integration, which refers to the fit between the system and the overall context of the organisation. When implementation of the Map of Medicine first started there was an emphasis on the system being used to support evidence-based practice, but in the following 12-18 months there was an increasing emphasis by NHS senior managers on the potential of the system to support the redesign of care pathways in order to help the NHS manage in a period of financial austerity. In the interviews with GPs the likely need to trade off cost and quality was highlighted, particularly by GPs who were actively engaged as commissioners of health services with the CCG, in addition to their role as providers of healthcare. This dilemma was highlighted by a number of GPs who referred on the one hand to wanting to do their best for the patient in front of them, whilst on the other hand being part of a commissioning process that could involve rationing care in order to make services more cost effective.

The dilemma about the trade-off between cost and quality also arose in the interviews with Community health staff, although from a different standpoint. They did not have the same role as GPs who were acting as commissioners through their role with the CCG, but some of the interviewees had been required to work on the redesign of the community element of care pathways and had used the Map of Medicine to support that work.

Another aspect of Contextual Integration was the leadership and resources provided for implementing the Map of Medicine. In the PCT in question, the lead role for the Map of Medicine was taken by one of the senior managers in the PCT Commissioning Department, and this appeared to limit the impact of the initial engagement with GPs. Subsequently the role was taken on by the PCT Medical Director, and this appeared to stimulate greater awareness amongst the GP community and the topic of the Map of Medicine then became the focus of discussion at the GP Target meetings. The level of resources assigned to the project was also an important factor. When the implementation first started, the NPfIT Programme Office had provided project resources, which were mainly focused on the technical tasks and on supporting the initial awareness events.

Unfortunately, those resources were withdrawn just at the point when potential users were starting to become aware of the system, and there was no dedicated resource provided for familiarisation and training. In the GP interviews, a number of respondents explained that, even though the system might be fairly easy to use, they were unlikely to set aside the time to explore it and adopt it as part of their everyday work unless someone could come to their surgery and show them how to use it. This is consistent with the findings of Murray et al (2011, p.8) who reported that a Community Nurse Information System had failed to become normalised due to the disbanding of a dedicated implementation group and to inadequate resources for training and support.

The NPT concept of Interactional Workability, which refers to the impact on interactions between health professionals and patients, emerged strongly in the qualitative phase of the case study although there were differences in the feedback from the study groups. Amongst the GPs, those who used the Map of Medicine during patient consultations described how the system had a positive impact on the level of understanding of patients about their health condition, about where they were along the care pathway and the potential options for treatment. The system was also used to help patients to understand why a particular treatment was not being given. This is broadly in line with the findings of James (2011) who has researched the applicability of NPT to speech therapy, and found that this concept helped explain the expectations of patients and therapists that an intervention would produce a change in the patient's condition and that patients would follow the advice of the health professional.

Amongst Community health staff it was unusual for the Map of Medicine to be used during a consultation, although the few who used the system this way felt it did support shared decision-making with the patient. A major difference between the study groups was that most of the work by GPs involved consultations with patients in their surgeries where they had ready access to an electronic patient record at their desk, which increased the level of Interactional Workability. In contrast many of the Community health staff tended to see patients in their homes or in care homes, had no access to any IT systems and were reliant on handwritten patient records.

The NPT concept of Relational Integration emerged in the qualitative phase of the case study in terms of the impact that the Map of Medicine had on the relationships between groups of health professionals, and again there are some clear differences between the two study groups. For GPs one of the main uses they made of the system was with trainee GPs or with medical students. Indeed, one of the GPs working in a training practice reported that the most frequent query from trainees was to ask how to do something and his stock answer was to tell them to look it up on the Map of Medicine. Another aspect of Relational Integration for GPs was their use of the system when discussing the care of a particular patient with their Practice Nurses, where the GP had directed the Practice Nurse to look on the system to validate the intended treatment plan. There was one example where a GP had used the Map of Medicine to support a discussion about the care of a patient with GP colleagues in the same practice, and in this instance that GP

reported that the system had helped them to reach a consensus about the next steps in the treatment plan.

The concept of Relational Integration emerged in a different way in the interviews with Community health staff. Several respondents reported how they felt that they needed to cite the relevant sources of information about evidence-based practice, in order to justify their actions to other health professionals. For example, one of the Nurse Practitioners reported that when writing a referral letter to a GP, she would cite the fact that she had looked up the care pathway on the Map of Medicine as this would give weight to the course of action she was recommending, although she added that she took care when wording the letter to make it clear that the final decision remained with the doctor. Another Nurse Practitioner explained how she would refer to the Map of Medicine, and other systems such as NICE, in conversations with GPs to promote a more equal dialogue with the doctor. The system was also sometimes used by Community health staff to empower them in their relationships with other health professionals. For example when talking to a GP, reference was made to a pathway on the Map of Medicine to explain why a referral made by that GP was deemed inappropriate by the nurse. This is consistent with the NPT study of telehealth by Godden and King (2011) who reported that Relational Integration was a positive factor where it increased the confidence of users that they were complying with evidence-based practice.

The final NPT concept to consider is Reflexive Monitoring, which refers to how a practice is understood and assessed by actors implicated in it. In the interviews with GPs it was clear that for several participants their views about the Map of Medicine had evolved over time, as their knowledge of the system developed and also as the broader context of the NHS changed, with the abolition of PCTs and SHAs and the creation of CCGs. For example, one GP reflected that she thought the system had considerable value and she felt she ought to be using it more than she did, but the challenge was finding the time to become familiar with it. Another GP, who had originally been sceptical about the system, had come round to thinking it did have a lot of potential, although he was concerned that localising national pathways might lead to a lower quality of care. The point they had reached in their careers also emerged in the Reflexive Monitoring by GPs. One of the younger GPs had used the Map of Medicine during her training and reflected that, since she had become a fully qualified GP she had tended to use other systems such as NICE because they suited her way of working. In contrast, a GP who had retired from full time practice and now worked as a locum reported that she had rarely used the Map of Medicine when it was first launched, but now that she that she worked part-time she was using it much more frequently because it enabled her to keep up to date.

There was less evidence of Reflexive Monitoring in the interviews with Community health staff, but where respondents did reflect on why they did not use the Map of Medicine they tended to consider that there were other online systems that were better suited to their information needs.

In conclusion, it is felt that NPT provides a useful way to make sense not just of what was happening but why it had happened. For example, the NPT concepts such as Contextual Integration and Interactional Workability can be used to contrast how a system like PACS became normalised (Murray et al 2011) partly because it met several organisational goals and had a positive impact on doctor-patient relationships, whereas the Map of Medicine was perceived by some users as being a tool to persuade them to change their professional practice in order to reduce costs. Taken together, concepts such as Skill Set Workability and Relational Integration help to explain why the system had become normalised more widely amongst GPs than Community health staff, whilst concepts such as Contextual Integration and Reflexive Monitoring help to explain how the use of the system evolves over time as the NHS changes and users reflect on its relevance to their working practice.

5.7 Summary

In this chapter the findings of the case study have been discussed and compared with the findings from similar evaluations of e-health systems, and the findings have been reviewed using the constructs of NPT.

The issues concerned with definitions of success and failure have been examined, and it is considered that it would be too simplistic to describe the implementation of the Map of Medicine in this case study as either a total success or a total failure, especially given the absence of any clearly defined criteria that were accepted by all of the key stakeholders.

The case study findings are consistent with the argument put forward by Takian et al (2012, p.9) that, rather than labelling projects as successes or failures it may be more helpful to refer to partial adoption, and rather than regarding non-use of systems or workarounds as a sign of failure, they should be thought of as “different enactments of technology-in-use”.

In the next chapter a summary of the thesis is provided, the limitations of the study and the implications for health informatics policy and practice are discussed, and suggestions are made for future research.

Chapter 6 - Conclusion

“When I was a boy of 14, my father was so ignorant I could hardly stand to have the old man around. But when I got to be 21, I was astonished by how much he’d learned in seven years”. Mark Twain (Quotations Book n.d.).

6.1 Introduction

The above quotation is intended to illustrate that I recognise the process of personal development I have been through, since the start of the Professional Doctorate programme.

This final chapter provides a summary of the thesis and a review of the limitations of the study. A reflective commentary is provided to show how the methodological challenges and ethical issues that arose during the course of the research project have been tackled,

Finally the implications of the study for health informatics policy and practice are considered, and suggestions are made for future research.

6.2 Summary of the thesis

This thesis covers an important research topic. In recent years the use of e-health systems has grown hugely, as governments across the developed world struggle to manage the challenges arising from demographic change, advances in medical technology, rising public expectations and financial austerity. There is good evidence that e-health systems have the potential to make a significant difference to the outcomes of patient care, but the literature indicates that many IT systems fail to meet their stated goals. The evidence suggests that in the NHS there has been a top-down approach to the introduction of new e-health systems that has focused on technology, and there has often been a failure to take account of the social and cultural issues.

The originality of this thesis is due to the fact that very little research about the Map of Medicine has been published in peer reviewed journals. The combination of the research topic and the use of Normalisation Process Theory as a framework to evaluate the implementation of the system is believed to be unique, and this project adds to the growing literature about the NHS National Programme for IT.

The thesis presents the results of a case study to evaluate the implementation of the Map of Medicine in primary and community care settings. A case study approach was used, rather than any sort of quasi-experimental methodology,

because of the need to explore the phenomena in depth in order to seek to understand how and why the system had been implemented.

The methodology used for the case study was partly based on the approach used by Greenhalgh, Stramer et al (2010b) for their evaluation of the NHS Summary Care Record, where there was a deliberate attempt to describe the social and political context of the introduction of e-health systems, rather than taking a more positivist approach based on the principles used for randomised controlled trials.

The case study was focused on the area covered by one Primary Care Trust and involved a quantitative phase, which involved the use of an online questionnaire sent to all GPs and Community health staff, followed by a qualitative phase that involved semi-structured interviews with GPs and with Community health clinicians. The case study also involved interviews with staff working at national and regional levels of the NHS and with staff from the systems supplier, as well as the analysis of material such as project initiation documents and project plans.

The findings indicate that, at the time that the fieldwork was undertaken, the Map of Medicine was used by about half of the GPs and just over a quarter of the Community health staff in the study population, although it should be recognised that the methods used could only provide a snapshot of a process that is constantly evolving. The findings from the qualitative phase indicate that the decisions taken by the NHS staff interviewed in the case study about whether to use any particular e-health system depended partly on the way that they initially engaged with the concept of the system in question. There were a number of factors that influenced those decisions, such as speed of access, ease of use and provenance of the content of the systems, and the reasons why interviewees chose not to use the Map of Medicine shed some light on how respondents had decided that there were other systems that they preferred to use.

The findings from the qualitative phase also highlight some marked differences between the two study groups. For example, some of the Community health staff reported that they regarded the system as being designed to meet the needs of doctors rather than nurses or allied health professionals. The two groups also differed in how and when they reported using the Map of Medicine, and in their perception of the impact of using the system. Several GPs used the system during their consultations, and many of those felt that using the Map of Medicine helped the patient to understand their health condition and assisted with shared decision-making. With Community health staff the Map of Medicine was generally used outside patient consultations and the main impact related to the use of the system for reviewing a care pathway or making a referral to another part of the NHS. When it was used for the latter purpose, some respondents reported that they would cite the use of the system as it made them feel empowered in their dialogue with other health professionals, particularly GPs.

The concepts of Normalisation Process Theory have been used to help to explain what had happened and why. For example the NPT concept of Cognitive Participation proved useful in understanding why some GPs became engaged with

the system and it also highlighted the impact of both formal and informal networks on the extent to which users were prepared to adopt changes in their working practices. Similarly the NPT concepts of Skill Set Workability and Relational Integration helped to explain why the system had become normalised more widely amongst GPs than Community health staff.

6.3 Limitations of the study

By undertaking this project it has been possible to gain an insight into the implementation of one aspect of the NHS National Programme for IT, about which little was previously known. The flexible and emergent nature of the mainly qualitative approach was well suited to the complex and messy nature of the working practices that this e-health system, the Map of Medicine, was expected to support. The research project has revealed a rich picture of the implementation of this system in primary and community care settings, and the research has uncovered many of the macro, meso and micro level factors and the relationships between those levels.

However, as with any research project, this study has certain limitations. Some of those relate to the methods that have been used and the skills of the researcher, while others arise from the scope of the study. It is quite common for researchers to design multi-site case studies to evaluate e-health systems, and for those projects to be longitudinal studies where the field work is carried out over several years. As this case study was undertaken as part of the Professional Doctorate programme and all of the field work and analysis was undertaken by one person, the definition or bounding of the case was deliberately focused on a local health community covered by a single Primary Care Trust. Although the scope was limited, the project entailed 39 interviews and the analysis of approximately 50 project documents.

A case study approach does have certain limitations (Crowe et al 2011). There is a risk that large volumes of data will be collected that may not be relevant to the case. In this study care was taken to align the data collection with the research question, whilst recognising the need to be flexible and allow for unexpected areas to be explored. Crowe et al also comment that case studies are sometimes criticised for lacking rigour, and advise that this should be addressed through triangulation and transparency throughout the period of the research project.

Other limitations of the research design relate to the methods of data collection used. The quantitative phase involved the use of an online survey, which can only provide a snap shot in time even though the real life situation being studied is constantly changing. As an online questionnaire was used, if the respondent found any of the questions ambiguous and had any queries, the researcher was not there to answer them. In order to achieve a reasonable response rate it was decided that it should be possible for the questionnaire to be completed in less than five minutes, so it was only possible to ask a limited number of questions.

The method used for the qualitative phase, semi-structured interviews, also has limitations. It could be argued that if the researcher concentrates too much on a pre-defined list of topics, there is a risk that other important information might be missed. On the other hand, the flexible nature of semi-structured interviews can also be problematic, particularly if the intention is to collect the views of different people about the same topic. The ability to deviate from the interview guide to explore certain topics in more detail can mean that some topics are not covered at all in every interview. Further limitations arose from the methodology used, in terms of the location of the interviews and the mode of interviewing (face to face or by telephone). The level of privacy during the interviews depended on the location of those interviews, and this is considered in the discussion of situational factors in section 6.4. The limitations of telephone interviews also merit some consideration. The literature suggests that telephone interviews tend to be shorter than face to face interviews, that research participants tend to speak for a smaller proportion of the time, and participants tend to respond in less detail than in face to face interviews (Irvine 2011). However, some participants may find a telephone interview preferable if the topic is considered to be of a sensitive nature (Chapple 1999), as was the case with some of the potential participants in phase one of the research project.

In the case study there was limited scope for checking the reliability of the interpretation of the data from the interviews. The original plan was to work collaboratively with another student on the PD programme to review each other's analysis of qualitative data, but unfortunately that student withdrew from the course. The fact that there was limited cross checking probably had some impact on the reliability of the findings, but in order to counter this a small sample of interview transcripts and the coding framework were reviewed by two experienced researchers (see section 3.8.7), and the analysis and emerging findings were discussed with those researchers and with the practice based supervisor on a regular basis. In any future research project it would be preferable for the analysis to be undertaken by more than one person to enable the interpretation to be validated.

For the qualitative phase of the study a stimulated recall technique was considered (Lyle 2003). This typically involves making video recordings of the activities of clinical staff in their everyday work. These are subsequently used during interviews to stimulate the participants' recall of their decision-making. This approach is resource intensive and would have raised significant ethical issues in terms of patient confidentiality. In a study by Brennan and Mattick (2010) a version of this approach was adopted whereby research participants were asked to complete a structured diary template to self-report the information resources used over a one week reference period, and that template was used as a stimulus during the subsequent interviews. Although the stimulated recall approach was considered for this study it was not used as it was felt that it would be unlikely that many busy clinicians would agree to use the template, and the approach was likely to increase the rate of attrition.

A further limitation relates to the limited access to individuals, and to relevant documents such as business cases, project briefs and project initiation documents, and to the contracts between government departments and IT system suppliers.

It proved particularly difficult to gain access to the wider stakeholders in organisations such as the Department of Health and NHS Connecting for Health. This was due in part to the highly charged political environment during the period of the fieldwork, which coincided with the upheaval associated with the passage of the Health and Social Care Act, the abolition of Primary care Trusts and Strategic Health Authorities, and the demise of the NHS National Programme for IT. Access to staff was also made difficult due to the fact that some of the key individuals had left the jobs they had held at the time that decisions were taken to implement the Map of Medicine.

In some cases, when contact was made with the relevant people they were reluctant to talk on the record and were hesitant about voicing their opinions, particularly about the financial aspects of the NHS National Programme for IT. This was addressed by inviting those participants to speak off the record and offering the option for the interview not to be recorded.

A few of those people did agree to be interviewed, but several requests for interviews or for access to documents were denied. Although this was a setback, the gap was partly addressed by locating interviews with some of those policy makers that had been published on You Tube by the NHS Institute for Innovation and Improvement (Gray n.d., Kumar n.d., Stein n.d.). However, it is acknowledged that this only partially filled that gap, because the researcher had no influence on the subject matter covered in those interviews.

Through discussion with another researcher who worked on the Connecting for Health Evaluation Programme (Cresswell (*pers. comm.*) 8 May 2012) it was found that this had also been a problem in those projects. Despite the fact that the Department of Health had formally commissioned various universities to carry out research into the National Programme for IT, those researchers were unable to gain access to certain documents or interview some of the key stakeholders.

6.4 Reflective commentary

Early on in the project it was recognised that there were a number of risks that were outside the control of the researcher. In order to address this, a risk register was produced to identify the main risks and mitigating actions that might be taken. For example, it was anticipated that front line clinical staff might be reluctant to respond to the online questionnaire, and therefore a covering letter was sent out in the name of the PCT Medical Director and Director of Community Services respectively.

Coping with setbacks has been an important learning experience. For example, the withdrawal of funding for transcribing the interviews led to some experimentation with the use of voice recognition software (which proved unsuccessful) and finally led to the researcher transcribing all of the interviews.

During the course of the project the findings from the case study and the wider lessons that could be transferable have been discussed with the supervisors, and this feedback has helped to refine the project as it has developed over time. Formative feedback has been provided to the local NHS organisations involved in the case study, and the methodology and the emerging findings have been discussed with researchers involved with the Connecting for Health Evaluation Programme.

Presentations on the research project as work in progress have been given at two national conferences, firstly the Primary Health Informatics 2012 Conference and then at the Health and Informatics 2012 Conference. Giving the presentations and answering questions from conference delegates assisted the development of the project in terms of reflecting on the importance of the research question and on the methods being used. After the second conference, the researcher was interviewed about the research project for an article in the e-journal E Health Insider (Todd 2012). The presentation at the Health and Informatics Conference led to the researcher being invited to present to a meeting of the Health Specialist Group of the British Computer Society. Although there were feelings of apprehension in advance of giving those presentations, on reflection a degree of discomfort and learning to deal with criticism are probably good things. The experience of presenting at conferences has enabled the researcher to become engaged with other people with similar research interests, and it has helped the researcher to become more confident about actively participating in online discussions about health informatics topics.

As well as national conferences, a presentation about the research project was given to meetings of professional peer groups such as the NHS North West Informatics Network. This enabled the researcher to discuss the research question and methods with other health informatics professionals, to reflect on the implications of the research for health informatics policy and practice, and led to the publication of an article in the HSJ (Cohen and Duper 2011).

As noted in Chapter 3, reflexivity plays an important role in a mainly qualitative study such as this, particularly in the interviews. One of the most significant factors was to attempt to establish a rapport with the interviewee, for example starting the interview by explaining the context and purpose. Care was taken with the order of the questions, and the interviews started with simple questions such as asking about the size of the practice population and the number of staff working in that practice. As the study progressed, the researcher used his field notes to reflect on his interviewing skills and became more confident in deciding when to be quiet and allow the interviewee to finish what they were saying, and when to probe or prompt the interviewee, for instance by asking “*can you tell me a bit more about ...*” In the later stages of the project the researcher felt more confident about leaving pauses

in the interview, to allow the interviewee time to reflect on a particular question and to gather their thoughts.

The importance of the settings for the interviews and the ethnographic approach defined by Pink (2012) which proposes the concept of a “place event” has been considered. It was anticipated that potential participants were more likely to agree to be interviewed at their place of work. It also became apparent that participants were more at ease in familiar surroundings, and some interviewees chose to act out through gestures and body language how they would use a reference book or website during a consultation, when looking for information about evidence based practice.

The situational and social factors of the interviews also merit some consideration. For example, all but one of the interviews with GPs were one to one, and most were held in the GP’s consulting room in their surgery premises. One GP interview was held in the doctors’ common room at the local hospital, and that interview proved very difficult to transcribe due to the level of background noise. In contrast to the GPs, many of the Community staff shared an office with colleagues and this had implications for participant confidentiality. In a few cases the participants chose to hold the interview in a meeting area or common room where other colleagues were passing by. The researcher felt that this had an impact on how the participant responded to some of the questions, as they may have been reluctant to make comments about other health professionals, local senior managers or NHS policies when they might be overheard.

As previously noted in section 3.6, a few of the phase one interviews were conducted on the telephone. These tended to be shorter and less informal than the face to face interviews, and it was impossible for the researcher to observe the body language of the interviewee in order to decide when to probe for further details in response to a particular question. However, although those interviews were probably less productive than those conducted face to face, it is important to acknowledge that some respondents had stated that they were only prepared to participate on condition that the interview was by telephone. In addition to the stated wish for brevity, it is possible that some interviewees were more comfortable discussing sensitive issues such as the cost and success or failure of aspects of the NHS National Programme for IT by telephone rather than face to face.

In order to gain access to research participants, the researcher needed to be flexible and to accept interviews at whatever time was offered, rearranging his own diary if necessary. A few times an interview was cancelled at short notice by the participant. Although the researcher felt frustrated about the cancellation, this was not expressed to the potential participant in the hope that the interview could be arranged on another date.

It is important to recognise that researchers do not exist in a vacuum. The choice of research question, research methodology and theoretical frameworks are all influenced by the researcher’s values and previous experience (Guillemin and

Gillam 2004, p.274). Due consideration of how findings are interpreted and how they are presented also forms part of a reflexive approach.

The social location of the researcher is another important factor, and Mauthner and Doucet (2003) comment on the ways in which researchers' emotional responses to interviews can shape the way in which the accounts of respondents are interpreted. They suggest that researchers should not automatically assume that what someone says in an interview provides direct access to their subjectivity and lived experience. For example interviews with individuals who were in powerful positions or were operating under extreme time pressure could cause the researcher to experience some anxiety. Similarly the researcher needed to take account of his own mood on the day of the particular interview, whether he felt at ease during the interview, and even whether he liked or disliked the respondent. A template was developed for recording ethnographic field notes to keep a contemporaneous note of the researcher's observations from each interview about details such as where the interviews took place, the setting (for example whether it was busy or quiet, formal or informal, whether there were other people in the immediate vicinity) and the researcher recorded his own feelings about how the interview had gone. An example of the field notes is included in Appendix 11.

It was recognised that there was a potential for bias to arise in the interviews, and Bowling (2007, p.156) describes the risk of social bias where the interviewee may give the answers that they think the researcher wants to hear. For example, this was apparent in an interview with a newly qualified doctor, where the researcher felt as if the participant was being very guarded in her responses rather than saying what she really thought. This may have been due to the age difference between the interviewee and researcher and with the researcher being perceived as an NHS senior manager.

At the start of the project the researcher was unsure about how to address the ethical issues that might arise during the research project. To address that gap the researcher undertook the relevant e-learning training on the university website, and also attended a meeting of the local NHS Research Ethics Committee.

Ethical issues could arise when a participant disclosed potentially sensitive information such as making critical comments about local NHS senior management or about NHS Connecting for Health. One of the most sensitive issues that emerged from the macro and meso level interviews concerned the cost of the contract for the Map of Medicine. During one of those interviews the participant stated that he was unable to disclose the cost, but later in the interview when he was reflecting on how the implementation had gone he did reveal the figure. This presented the researcher with an ethical dilemma about whether to include that information in the findings.

Another ethical issue concerned the maintenance of confidentiality. Although the researcher has attempted to anonymise cases and individuals who participated in the study, there is a risk in case studies (Crowe et al 2011) that readers with insider knowledge might be able to identify locations or individuals. To reduce that

risk, specific job titles have been removed and replaced with more generic labels such as “Senior Manager”.

The final ethical issue that arose was the status of comments that participants would sometimes make after the end of the formal interview, when participants were asked if there were any other comments they would like to make. Warren et al (2003) discuss what happens after the interview, in that strip of time between the recorder being switched off and what the authors describe as the “*leave taking rituals*”. They describe how, in thanks for the respondent’s time, the interviewer may hand over control of the conversation to the respondent. In their review of qualitative interviews Warren et al suggest that the respondent may hand control back and leave, or the respondent may put forward their own agenda by making off the record comments or by asking questions about other respondents.

Bryman (2008) suggests that valuable material can be lost if the researcher switches off the recorder immediately after the end of the formal interview. From the point of view of the interviewee, those comments could be regarded as being off the record, and Bryman suggests a way of dealing with that ethical issue is to ask the interviewee if they will agree to those post interview remarks being included in the research.

6.5 Implications for policy and practice

During the period of the fieldwork, the NHS National Programme for IT was gradually being wound down and the responsibilities of NHS Connecting for Health were being transferred to other parts of central government. Despite the criticisms of the previous Labour government and the revelation in the Final Benefits Statement on the National Programme for IT presented to the House of Commons Public Accounts Committee that, as of March 2012, the major elements of the programme had 98% of their benefits yet to be realised (National Audit Office 2013), national NHS policy looks strangely familiar. The coalition government has launched a new national information strategy for the NHS (Department of Health 2012), followed by a national initiative to introduce integrated digital care records (NHS England 2013). In subsequent interviews (BBC News 2013) the Secretary of State for Health has set a target for the NHS to become paperless by 2018, claiming that this will save the NHS many billions of pounds. This message has been echoed by claims made by the NHS Director of Patients and Information that IT can fill a large part of the £30 billion NHS funding gap (Todd 2013). A recent study by the Nuffield Trust (Roberts, Marshall et al 2013) suggests that the annual funding gap faced by the NHS is likely to grow to £44 billion by 2021/22, and in spite of the lack of evidence about the deployment of e-health systems leading to substantial cost savings (Cross 2013), the political pressure to implement e-health systems in the NHS in order to save money is likely to continue.

There is a tendency for e-health systems implementation to be seen as a mainly technical undertaking, where projects are ticked off and the staff concerned move on to the next project, often without checking whether the implementation of the e-health system has achieved what was intended at the outset. The implications of this research project underline the need for policy makers to take due account of the risks of withdrawing project support before the target audience has had time to become familiar with the system and for changes in working practices to become embedded, and this is consistent with other studies (for example McLellan 2012).

There are also implications about the need for NHS decision makers to communicate clear messages about how any new system will support the working practices of users, so that appropriate plans can be made to accommodate those changes. In this study there was ambiguity about the benefits that were expected to arise from using the system, and this probably contributed to the partial adoption.

This research project adds to the growing body of literature about the evaluation of e-health programmes, for example in section 2.8.4 on the CfH Evaluation Programme, and has implications for NHS policy on health informatics. It can be viewed in the context of the paper by Greenhalgh, Russell et al (2011) on the reluctance of policymakers to learn from history. They argue that lessons are rarely learned from large scale e-health programmes because they are conceptualised as mainly technical undertakings. The implications of this case study support the conclusion of those authors that NHS policymakers often take a determinist position where it is assumed that a given technology will have a measurable impact, that sponsors often continue to spend on projects rather than face up to the sunk costs, and that there is a reluctance to accept the nuanced messages from in-depth case studies about the complex reasons for the low rate of adoption of technology.

The NHS currently invests significant amounts in e-health systems such as the Map of Medicine and NHS Evidence, to provide staff with access to information resources to support their evidence-based practice, and this project reinforces the message that those systems need to be easy to use and straightforward to access.

The requirement to use a smart card, which existed at the start of the implementation of the Map of Medicine, was regarded by users as an unnecessary barrier. Where a new system, such as the Map of Medicine, is being introduced it needs to be perceived by users as being better than those already being used, as users will need to be convinced about making the effort to get to know how to use it. There is also a need to be realistic about the fact that some tasks may become slower by using a new system, and that it can take a long time for systems to become normalised and for benefits to be realised.

This research also serves to highlight the obstacles caused by the complex contractual relationships that were set up as part of the National Programme for IT. This made it difficult for the system suppliers to respond quickly to requests for changes from the user community, and is consistent with other similar studies

(Robertson 2010, Greenhalgh, Stramer et al 2010b). There are implications for the NHS in terms of how a balance is struck between national contracts that achieve economies of scale, and local contracts that enable suppliers to respond more flexibly to local requirements.

Another issue to consider is the different ways in which the various stakeholders made sense of the reasons for implementing the system. Section 5.3 makes clear that there were many different perspectives about what would constitute success or failure. There are implications for future e-health system implementations in terms of the need to take account of the different perspectives of senior managers, clinicians, informatics staff and system suppliers. There is a need to ensure that there is regular dialogue between the various stakeholders, and to consider how best to address the differences in culture and in the language used by those groups.

There are also implications for those working in the health informatics profession. It was apparent, from professional network meetings and from presentations given at conferences, that few informatics professionals were aware of the products of the CfH Evaluation Programme and other similar academic evaluations of e-health. A strong case can be made for the health informatics profession to regard the evaluation of systems with the same importance that the medical and nursing professions attach to clinical audit (Ammenwerth and Shaw 2005). The apparent lack of connection between academia and the world of NHS informatics, and the challenge of encouraging an evidence-based approach to the practice of health informatics needs to be addressed by the professional bodies for health informatics such as ASSIST and UKCHIP, and also by the Department of Health.

6.6 Suggestions for future research

Relative to the large cost of many e-health initiatives such as the NHS National Programme for IT, a strong case can be made for policy makers to invest in independent evaluations of those investments. Indeed it is arguable that plans for the evaluation of these sorts of initiatives should be included at the start of such programmes, rather than being added on as an afterthought. A recent systematic review of the factors that promote or inhibit the implementation of e-health systems (Mair et al 2012) suggests that there is need for more research on the impact of those systems on roles and responsibilities, on ways of engaging with health professionals and on ensuring that the potential benefits of systems are made evident through ongoing evaluation.

Further research about the impact of the Map of Medicine is required, using study designs that are capable of generating good quality evidence, in order to support future investment decisions.

If an e-health system such the Map of Medicine is going to be implemented in the NHS In the future, it might be preferable to undertake a longitudinal case study

about the implementation of that system. This would allow evidence to be gathered about the use of information resources to support evidence-based practice prior to the launch of the system. This could be followed up some months after the system had been launched, and repeated again subsequently in order to build up a rich picture, given that changes to working practices often take months or even years to become normalised.

As this particular case study was undertaken as part of the Professional Doctorate in Health programme there was a finite limit in terms of researcher time and resources. In any future research it is suggested that a multi-site case study should be considered, to enable the results from different local health communities to be compared and contrasted. During the course of this case study it was suggested that a comparative case study should be undertaken, where a local health community that was regarded as an exemplar of good practice would be compared with another health community that was regarded as having failed to implement the system, but this was beyond the scope of the PD programme. It would also be useful to extend the scope of the study to include the use made of such systems by commissioners of health services, as well as by clinicians engaged in patient care. A longitudinal research project would need to be adequately resourced but would allow a deeper understanding to be developed about how e-health systems do, or do not, become embedded in working practices and how this evolves over time.

As well as further research in England it would be useful to compare that with the implementation of the Map of Medicine in countries such as Australia and New Zealand (Map of Medicine 2013). Although the healthcare systems in those countries differ from the NHS there may be valid lessons to be learned from making international comparisons.

Any future research in this area would also benefit from being undertaken by an interdisciplinary research team, to enable different but complementary approaches to be taken in the design of the research, and in the analysis and interpretation. This might include a health economics perspective and also the consideration of other suitable theoretical frameworks for the evaluation. This case study, as well as some of the projects that formed part of the CfH Evaluation Programme, has highlighted a need to question the assumption that information technology is inherently a good thing and to consider what success would look from the perspective of all stakeholders.

In conclusion, although the number of studies about the evaluation of e-health systems is growing and despite the occasional reports of success, most reports describe a complex picture where the outcomes are often ambiguous. It seems that there are no simple checklists that can guarantee successful implementation and there are no magic bullets. Perhaps the final word about future research involving the evaluation of e-health initiatives should come from the paper by Greenhalgh, Russell et al (2011, p.534) which discussed the reluctance of policymakers to learn from history.

“We need fewer grand plans and more learning communities”.

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Appendices

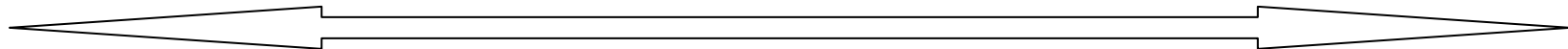
Appendix 1

A conceptual map of e-health

A conceptual map of eHealth

Informing and supporting decisions		Storing and managing data		Delivering expertise and care at a distance	
<i>Supporting Patients/Citizens</i>	<i>Supporting Professionals</i>	<i>Data</i>	<i>Records Systems</i>	<i>Expertise & Knowledge</i>	<i>Care</i>
Online information on health/lifestyle or illness/treatments	Case-specific diagnostic or treatment advice based on patient data & expert knowledge / evidence	Patient-specific records, supporting care of individuals	Clinical (e.g. for capturing, displaying, sharing, linking or exchanging patient-specific data; or populating decision support)	Diagnostic or treatment advice from subject experts (e.g. telepathology)	Patient-provider email; internet consultations
Tools for balancing risks/benefits to aid choices	Automated prompts & reminders for guideline compliant prescribing	Population-based data, aiding research, policy & planning	Administrative (e.g. for audit, purchasing, billing, tracking service utilization etc.)	Medical conferencing; clinical email	Remote interventions (e.g. telesurgery, telepsychiatry)
Targeted educational interventions	Electronic guidelines, research reports and CPD tools	Administrative data, aiding organisational & business processes		Mobile access to records & evidence	Home & ambulatory disease monitoring & self-management support
Personal Health Records & self management aids		Integrated records supporting multiple stakeholders			
Online support networks		Medical images			

Pervasive e-health theme: networked digital information and communication



Adapted from Sheikh, McLean et al (2011)

Appendix 2

Covering letter for the online questionnaire

1 February 2012

Dear Colleague,

A mixed methods case study of the use of an e-health system to promote evidence-based practice in primary and community care settings.

We all use our knowledge, books, and increasingly electronic 'decision support' resources to help us make the right decisions about diagnosis, investigations, treatment and referral, or to help us teach medical students or discuss issues with our patients.

We are fortunate in having Colin Cohen in our PCT; he has spent many years supporting our IT strategy and systems. Colin is now conducting a study on the impact of the Map of Medicine and other on-line information sources on evidence-based practice, as part of a Doctorate programme run by the University of Bath. It is well documented that the implementation of IT systems in healthcare settings can be problematic, and that the potential benefits are often not fully realised. The overall aim of the project is to assess the impact that the Map of Medicine and other online information sources have had on working practice, and to identify any lessons that can be learned for the future implementation of e-health systems. I will be very grateful if you would participate in this short survey, and help Colin in this important research.

The first phase of his study involves the collection of data through an online questionnaire, which aims to find out about the current level of use of the Map of Medicine and other similar online systems. The questionnaire is anonymous, although you are invited to provide an email address if you would like to participate in the second stage of the project. **If you click on the link below it will take you to the questionnaire, which should only take you a few minutes to complete.**

<http://www.surveymonkey.com/s/97CN723>

Further information about the research project is available from:

<http://www.tamesideandglossop.nhs.uk/resinfo>

Any questions about the study should be directed to Colin Cohen. He can be contacted at colin.cohen@nhs.net or by phone on xxxx xxx xxxx.

Thank you for your cooperation.

Dr xxxxx
BA MSc MBBS FRCGP
Medical Director
xxxx PCT

Appendix 3

Online questionnaire

Use of e-health systems including the Map of Medicine

1. What is your profession?

- ☐ General Practitioner
- ☐ Nurse Practitioner
- ☐ Practice Nurse
- ☐ Allied Health Professional
- ☐ Practice Manager
- ☐ Health Care Assistant
- ☐ Other (please specify)

2. Number of years in clinical practice

- ☐ Under 2
- ☐ 2 to 5
- ☐ 6 to 9
- ☐ 10 to 15
- ☐ 16 to 19
- ☐ 20 or over

3. Your gender

- ☐ Male
- ☐ Female

4. Your age

- ☐ I prefer not to say
- ☐ Under 20
- ☐ 20-29
- ☐ 30-39
- ☐ 40-49
- ☐ 50-59
- ☐ 60-69
- ☐ 70 and over

Use of e-health systems including the Map of Medicine

5. Apart from the Map of Medicine what other systems do you use to support your evidence-based practice? (Please tick all that apply)

- ☐ Mentor
- ☐ GP Notebook
- ☐ Clinical Knowledge & Skills (CKS)
- ☐ NHS Evidence (formerly NHS National Library for Health)
- ☐ NICE
- ☐ Online journals
- ☐ Google Scholar
- ☐ Other (please specify)

6. Do you ever use the Map of Medicine?

- ☐ Yes
- ☐ No

If no, we'd like to understand why. Please can you briefly explain the reasons why you don't use it.

7. On average, how frequently do you use the Map of Medicine?

- ☐ About once a day
- ☐ About once a week
- ☐ About once a month
- ☐ About once a year

Use of e-health systems including the Map of Medicine

8. If you use the Map of Medicine DURING a patient consultation, how do you use it? (Please tick all that apply)

- ☐ To look for local referral forms
- ☐ To check about the availability of local services
- ☐ To review the recommended care pathway
- ☐ To show information to a patient or carer
- ☐ To check recommended dosages when prescribing, or to check contraindications
- ☐ To look up information about a rare clinical condition
- ☐ Other (please specify)

9. If you use the Map of Medicine OUTSIDE a patient consultation, how do you use it? (Please tick all that apply)

- ☐ To look for local referral forms
- ☐ To check about the availability of local services
- ☐ To review the recommended care pathway
- ☐ To show information to a trainee clinician
- ☐ To discuss the care of a patient with clinical colleagues
- ☐ To look up information about a rare clinical condition
- ☐ To support your professional appraisal
- ☐ Other (please specify)

Use of e-health systems including the Map of Medicine

10. If you would be willing to be interviewed about the use of e-health systems (as part of a doctoral research project) please give your email address and a contact telephone number below.

Thank you for your participation in this survey

Appendix 4

Other results from the online questionnaire

Completion of questions

	GPs	Community staff
Q1 Profession	98%	99%
Q2 Years in clinical practice	100%	86%
Q3 Gender	98%	100%
Q4 Age	98%	97%
Q5 Systems for EBP	96%	76%
Q6 Ever use MoM?	98%	84%
Q7 Frequency	100%	94%
Q8 Use of Map during consultation	83%	47%
Q9 Use of Map outside consultation	79%	94%
Q10 Willing to be interviewed	21%	10%

Gender of GPs

Gender	Survey		All GPs	
	n	%	n	%
Male	31	69%	79	58%
Female	13	29%	58	42%
No response	1	2%	0	0%
Total	45	100%	137	100%

Gender of Community staff

Gender	Survey		All staff	
	n	%	n	%
Male	17	8%	52	7%
Female	203	92%	704	93%
No response	0	0%	0	0%
Total	220	100%	756	100%

Use of the Map of Medicine by years in practice – GPs

Years in practice	Use the Map of Medicine			
	Yes		No	
	n	%	n	%
Under 2	2	40%	3	60%
2 to 5	1	25%	3	75%
6 to 9	5	71%	2	29%
10 to 15	7	63%	4	36%
16 to 19	2	100%	0	0%
20 or over	8	50%	8	50%
Total	25	56%	20	44%

Use of the Map of Medicine by years in practice – Community staff

Years in practice	Use the Map of Medicine			
	Yes		No	
	n	%	n	%
Under 2	1	17%	5	83%
2 to 5	4	17%	20	83%
6 to 9	9	28%	23	72%
10 to 15	5	16%	27	84%
16 to 19	4	19%	17	81%
20 or over	26	36%	47	64%
Total	49	26%	139	74%

Appendix 5

Participant information sheet

Information sheet for research participants

Name of the study

A mixed methods case study of the use of an e-health system to promote evidence-based practice in primary and community care settings.

Researcher

Colin Cohen, Head of Information Technology

Contact details

(address shown here)

Email: colin.cohen@nhs.net

Phone: xxxx xxx xxxx

Supervisor contact details:

Dr Alan Buckingham, School for Health, University of Bath, BA2 7AY

Email: a.buckingham@bath.ac.uk

Phone: 01225 385433

What the study is about

This study is being carried out by Colin Cohen as part of his Professional Doctorate, run by the Department for Health at the University of Bath.

This research project involves an investigation of

- the level of awareness and use of the *Map of Medicine* in primary and community care settings
- the reasons for the variability in the use of the *Map of Medicine*
- how the *Map of Medicine* is used during patient consultations

The overall aim of the project is to identify any lessons that can be transferred in terms of using e-health systems to promote evidence-based practice.

Why you have been invited to take part

The study involves the collection of data from a variety of sources. The research methods include interviews with healthcare professionals working in primary and community care settings in the Tameside & Glossop area.

What the study will involve for you

If you agree to take part, Colin will phone or email you to make an appointment to interview you. This will normally be held at your workplace, but if it is more convenient for you the interview can be held at the offices of the PCT. The interview will probably take up to one hour and the interview will be recorded, if this is acceptable to you, so that an accurate record can be made.

You are welcome to ask questions about the study before you decide whether to take part. Before the interview you will be asked to sign a consent form, so that there is a formal record that you have agreed to take part in the study.

What will happen if you do not want to carry on with the study?

You are free to withdraw from the study at any time without any penalty, by letting the researcher know of this decision.

Ethical approval

This project has been reviewed by, and has received ethics clearance through, the Research Ethics Approval Committee for Health of the University of Bath.

How is the project being funded?

The project is entirely self funded.

Who is involved in the project?

Colin Cohen, Head of Information Technology for xxxx PCT, is carrying out the research as part of a doctorate programme run by the University of Bath. Other members of staff at the PCT or the University may be involved in some of the data analysis.

What will happen to the information that is collected?

Any information you give will be treated as confidential. The recordings of the interviews will be transcribed, and the comments from all the interviews will be analysed to give a full picture of your experiences, and of other health professionals like you. All of the recordings and documents will be stored in a secure manner and only the people doing the data analysis will have access to them. At the end of the project all original documents and recordings will be destroyed.

When the research report is written all names of people who have been interviewed will be replaced by pseudonyms, and the report will not contain any information that could reveal your identity.

What are the benefits and risks for participants?

It is highly unlikely that there are any risks from participating in this study. There may be some small benefit in knowing that you have helped an NHS colleague complete their doctorate, and it is possible that the findings of the research may influence the implementation of future e-health systems.

Thank you for reading this participant information sheet, and I hope that you will agree to participate in the study.

Appendix 6

Consent form

Consent form

Name of the study

A mixed methods case study of the use of an e-health system to promote evidence-based practice in primary and community care settings.

Researcher

Colin Cohen, Head of Information Technology

Contact details:

(address shown here)

Email: colin.cohen@nhs.net

Phone: xxxx xxx xxxx

Supervisor Contact details:

Dr Alan Buckingham, School for Health, University of Bath, BA2 7AY

Email: a.buckingham@bath.ac.uk

Phone: 01225 385433

Purpose of the study

There is good evidence that e-health systems have the potential to make a significant difference to the outcomes of care through delivering knowledge in the right place at the right time. A crucial element of the NHS approach to improving knowledge management is the *Map of Medicine*, which is designed to deliver current, evidence-based clinical knowledge from authoritative sources. The research evidence also suggests that, for a variety of reasons, many e-health systems fail to achieve their stated aims.

This research project involves an investigation of

- the level of awareness and use of the *Map of Medicine* in primary and community care settings
- the reasons for the variability in the use of the *Map of Medicine*
- how the *Map of Medicine* is used during patient consultations

The overall aim of the project is to identify any lessons that can be transferred in terms of using e-health systems to promote evidence-based practice.

Declaration from the participant:

	Please tick if you agree
I confirm that I have read and understood the information sheet for research participants for the above project.	
I have had the opportunity to ask questions about the study, and I have received satisfactory answers to questions and any additional details requested.	
I understand that that I am free to withdraw from the study at any time without giving a reason.	
I understand that this project has been reviewed by, and has received ethics clearance through, the Research Ethics Approval Committee for Health of the University of Bath.	
I understand who will have access to any personal data provided, how the data will be stored, and what will happen to the data at the end of the project.	
I agree to take part in an interview as part of the above research project.	

Print name of participant Signature Date

Print name of researcher Signature Date

Appendix 7

Example guide for CfH and SHA interviews

Guide for semi-structured interviews with SHA and CfH staff

Start by explaining the purpose of the research. Remind the interviewee that they need to give informed consent and need to sign the consent form, and that the interview will be recorded for later transcription.

1. Background to the programme

When did the Map of Medicine programme first get started in CfH (or the SHA)?

How did the programme get started? Who was responsible for initiating it?
(Prompt – *was it seen as primarily as an IT project, a clinical project, a management project etc*)

2. High level aims and objectives

What were the main aims of the programme?

What broader health policy aims or objectives was the Map of Medicine expected to support?

(Prompt – *eg promotion of evidence based practice, delivery of decision support to front line staff, enable development of care pathways across care settings etc*)

Within the SHA (or CfH) who was responsible for championing the programme?
What were the arrangements to ensure there was clinical leadership and engagement?

3. Other e-health systems to support evidence-based practice

Did CfH (or the SHA) consider doing any sort of options appraisal of systems to support those aims and objectives?

Apart from the Map of Medicine, what other e-health systems to support evidence-based practice were considered? (Prompt – NICE website, CKS, Mentor, GP Notebook)

What was it about the Map of Medicine that persuaded the SHA (or CfH) to implement that system rather than other similar applications?

4. Resourcing the Map of Medicine

How much did the Map of Medicine cost, in money and people's time?
(Prompt – *was there a national or SHA business case, how was it funded, how much was from central or from SHA budgets*)

What was the CfH (or SHA) expectation around return on investment?

5. Success of the programme

At the start of the programme what criteria were intended to be used to measure the success or failure of the Map of Medicine?

(Prompt - How have those criteria changed over time?)

Was there a Benefits Realisation programme, and if so what has been measured as part of that?

What do you regard as the main successes of the programme?

And are there any aspects where you think the programme has failed?

6. Lessons learned

What do you regard as the main lessons that have been learned from the Map of Medicine programme?

7. Do differently

If you were starting the programme again, with the benefit of hindsight what would you do differently?

8. Closing the interview

Is there anything else I should have asked you?

Would you like to add anything?

Thank you for your time

Appendix 8

Example guide for GP interviews

Guide for semi-structured interviews with GPs

Start by explaining the purpose of the research. Remind the interviewee that they need to give informed consent, and that the interview will be recorded for later transcription.

1. Background to the practice

How many staff are there in this practice? (doctors, nurses, admin, other)

How many registered patients are there in this practice?

Is there anything unusual about the population served by your practice? (*Prompt - for instance a larger than average elderly population, large minority ethnic population, an unusually high level of long-term conditions*)

2. General attitude to technology

How would you characterise the attitude of the staff in this practice towards the use of IT systems? (*Prompt – has the practice been involved in other IT projects, what is the general level of interest in use of IT, does that differ between GP partners, nurses, admin and others?*)

3. Information about the Map of Medicine

How did you get to hear about the Map of Medicine?

Did the Map of Medicine sound like something you wanted to use or be involved with in your practice?

(*Prompt - how was the system initially received, how did people conceptualise it and make sense of it, did it seem like the sort of thing that was worth putting some effort into?*)

4. Use of online sources of information on evidence-based practice

Apart from the Map of Medicine, what other sources of information on evidence-based practice do you use?

5. Consultation

Have you used the Map of Medicine during any patient consultations?

If so what have you used it for? (*Prompt-to review the recommended pathway, look up information about a rare clinical condition, look for referral forms, show information to a patient or carer, check local services*)

What impact has it had on the nature of the consultation or on its length?

If you never use the Map of Medicine, why don't you use it? (*Prompt- there are other better systems, it's easier to get answers from other websites like patient.co.uk, the layout isn't user-friendly, don't like the layout*)

6. Use of the Map of Medicine outside a consultation

If you use the Map of Medicine outside a consultation, how do you use it?

(Prompt-for example to review the recommended pathway, look up information about a rare clinical condition, discuss the care of a patient with clinical colleagues, look for referral forms, support your professional appraisal)

Has the Map of Medicine had any impact on your relationship with other health professionals? *(Prompt-for example has it made any difference to the level of trust between doctors and nurses or Allied Health Professionals?)*

7. Positive or negative aspects

Do you think there any positive aspects from using the Map of Medicine? *(Prompt – how does it fit in with the goals of the PCT or CCG such as QIPP, the promotion of evidence-based practice, getting people to follow recommended care pathways etc?)*

Do you think there are any negative aspects from using the Map of Medicine? *(Prompt –do you think it could de-skill the role of the clinician, was the implementation effective and how could it have been done better?)*

8. Closing the interview

Is there anything else I should have asked you?

Would you like to add anything?

Thank you for giving up your time.

Appendix 9

Thank you letter to research participants



(PCT logo shown here)

Dear

A mixed methods case study of the use of an e-health system to promote evidence-based practice in primary and community care settings.

Thank you for agreeing to take part in the above research project. The time that you gave up for the recent interview was much appreciated.

The recording of your interview will now be transcribed and anonymised. If you wish to discuss any aspect of the interview or your involvement in the project please feel free to contact me by phone on xxxx xxx xxxx or by email colin.cohen@nhs.net

Please find enclosed a copy of your signed consent form.

Yours sincerely

Colin Cohen

Appendix 10

Extract from a coded transcript of an interview

Extract from a coded transcript of a GP interview

Interviewer Do you ever use the Map of Medicine during consultations?

Respondent Yes

Interviewer If you do, are there particular ways in which you find it useful to have it in front of you?

Respondent Erm, I use it when, erm, I'm deciding on investigations....

Use of MoM: for investigations

Interviewer OK

Respondent Erm, and I use it as an aide memoire to ensure that I've done all the history and the examination that would be expected for the condition that I'm suspecting. And I use it for investigations (pause)

Use of MoM: as reminder

Interviewer In terms of how often you use it, is it when you see a patient with a rare condition?

Respondent No, for standard conditions. The one that comes to mind is polycystic ovaries. It's a, erm... No matter how many times I look at the pathway (laughs) I need to remind me which ones I need to look at

Use of MoM: for common conditions

Use of MoM: as a reminder

Interviewer I was interested as one of the ideas that been discussed quite frequently as a reason for having this sort of e-health system, is to try and help people manage the feeling of information overload.

Respondent Mmm

Interviewer You were saying it helps you to remember what to do. Do you think it contributes to helping you to manage that feeling of there being too much information?

Respondent Yes it does, it does. It's in one place, so I'm not having to look elsewhere (pause). It helps the flow of the consultation.

Information overload

Impact of MoM: flow of the consultation

Interviewer So, would it, erm, ever be the case that you would show what's on screen to the patient?

Respondent Definitely (pause). The way I introduce it is "Well, from the condition you're telling me about I think it's this, and given these

Use of MoM: show to the patient

symptoms and signs and I would like to investigate it, and just to share with you, this is what I'm basing my... my decision-making on".

Impact of MoM:
shared decision-
making

Interviewer So in terms of the impact it's having on the nature of the consultation, erm, if you're using it to help explain to the patient what the condition might be and the sort of investigations, erm, do you have a feeling for what sort of impact it has?

Impact of MoM:
patient understanding

Respondent Yes I think the patient gets a better understanding. It's a visual thing. I turn the screen to show them. I'll give you another example there was a patient with psoriasis. I know the pathway well. The patient was wondering what's next, so the pathway kind of shows the different treatment modalities, and we kind of looked and said "Well, you've tried that, you've tried that, you've tried that", and I think he understood. "We haven't tried this one; shall we give this one a go?" He seemed to accept it, he was asking for a secondary care kind of drug, which is quite a drastic drug. I said "If you're in agreement let's try this one, and if that fails then we're justified to do the referral".

Use of MoM: show to
the patient

Patient expectations

Interviewer One GP I've spoken said that typically in a doctor- patient consultation a patient only retains about 3 out of 10 of the bits of information a GP has been telling them

Respondent Mmm

Interviewer That GP felt showing a patient those sorts of systems, showing a patient information, will help the patient retain them. Does that make sense to you?

Impact of MoM:
patient
understanding

Respondent I would say so. The feedback I've had when I've shown the pathway has been "I understand why you're doing it this way". Because time is finite in the consultation, and you know I ask them "Do you have access to the internet?", if they do then I signpost them to the NHS Choices website to get access to the Map themselves. If they don't then I'm printing it off, but I'm not generally printing many as people seem to have access to the internet.

Time pressures

Interviewer Do you feel that using the Map as part of the consultation makes the consultation longer?

Respondent It does. It lends itself more to a 15 minute consultation than a 10 minute one

Impact of MoM:
duration of
consultation

Interviewer So just in terms of how you manage the work in your

practice, would you consciously set aside a longer slot, or are they routinely 10 minutes?

Respondent They are all routinely 10 minutes (laughs). We don't generally have that luxury of saying we're running over a bit, let's extend the consultation. We can't do that, or adapting it. Generally the surgery is full.

Time pressures

Interviewer So just to go back to make sure I've understood, in terms of using the Map, you're looking at the pathways and what's in there in terms of things like investigations and taking a history, and also you're using it as a tool to show to the patient.

Respondent Yes, and also management options. That's local services, different medicines that could be tried (pause). I don't know if it goes on to ask how do I ... What else do I use it for? (laughs)

Use of MoM:
treatment options

Interviewer We've covered the consultation, so I'm going to move on to how you use it outside a consultation (both laugh).

Use of MoM: patient
unmet need

Respondent I like it as a bank for referral forms, erm (pause). I like it to use when I've been presented with what we call a patient unmet need or a doctor educational need. Erm, so when I've identified one of those, I utilise then at home to address that.

Use of MoM: doctor's
educational need

Interviewer Could you just illustrate what you mean by a patient unmet need?

Respondent Yeah, so this is where, erm, where you as a doctor have not been able to meet a patient's need for treatment, investigation or whatever, because of a lack of educational knowledge that you might require. So it's where you recognise that, and then you need time to address that

Use of MoM: patient
unmet need

Interviewer Yeah

Respondent So in our appraisal, what we're encouraged to do is keep a log of these PUNs and DENs as they're called.

Interviewer Sorry?

Respondent that's P.U.N. Patient Unmet Needs or Doctor Educational Needs

Interviewer I haven't heard those terms before. And is that something that's, erm, unique to your practice?

Respondent No, no. It's a way of learning, that's an adult learning tool as such. So an example is that, erm, a new diagnosis of atrial fibrillation in an elderly patient with dementia. I was faced with the situation "Do I anticoagulate this patient or not?" And the Map helped me to decide a) whether the condition warranted it, and yes it did. Then it also helped me to decide whether the use of this drug Warfarin was going to be of more benefit or risk to this patient...

Use of MoM: doctor's educational need

Use of MoM: decision-making

Interviewer Yeah

Respondent So it introduced me to other tools I wasn't aware of, called the help tool. It allowed me then to apply that to this patient, and then come to a reasoned decision why I was going down that care pathway.

Use of MoM: decision-making

Interviewer Just to stick with that example, would you record anywhere the fact that you used the Map as a knowledge tool?

Respondent That's right. I record it in my appraisal toolkit, under what's called the PUNs and DENs log

Use of MoM: professional appraisal

Interviewer And, your appraisal toolkit, is that something, forgive my ignorance, is it something GPs generally use?

Respondent Yes, I think the minority of GPs in this area are using paper and handwriting, erm. As an appraiser I'm doing between 7 and 8 appraisals a year, and all of them have used the computer for that.

Interviewer OK (pause). Another thing that came up in the online survey was using the Map to look up information about a particularly unusual clinical condition. I wondered if that was something you use it for?

Respondent I've not found the Map particularly helpful for rare conditions, erm. I think it's useful for more common conditions

Use of MoM: common health conditions

Interviewer If there was a rare condition, and if the Map isn't very useful, are there other online sources you'd use?

Respondent It tends to be Wikipedia then (laughs)

Other information sources for EBP

Appendix 11

Example of field notes from an interview

Field notes re interviews

Interview with	Dr xxxx
Date	Friday 22 June 2012
Time	11.30 am
Where the interview took place	At the xxxx Medical Practice.
The setting (busy/quiet, formal/informal, many/few other people in the vicinity)	<p>The setting was her consulting room in the general practice. It was quite informal. I noticed that there were several documents and books piled up on the desk, as well as the computer keyboard and screen.</p> <p>We were not interrupted during the interview.</p> <p>I had sent xxxx a copy of the participant information sheet and the consent form about a week before. At the start of the interview she confirmed that she had read the documents, and she was happy to sign the consent form.</p>
Any feelings about the interview	<p>I have known xxxx for about 10 years. Our contact had usually involved me attending PEC or Board meetings to present reports to a large group of senior managers and GPs.</p> <p>The interview proceeded in an amicable way. It felt like we were both relaxed, and I took care to allow space for her to answer the questions in her own time.</p> <p>She said she regarded herself as a reflective person, so it felt OK for me to leave pauses in the conversation.</p> <p>The interview lasted 67 minutes, and we continued chatting after I turned off the recorder for about another 5 minutes, as she wanted to suggest some fairly newly qualified GPs for me to approach about being interviewed.</p>
Key points and new areas of interest	Works part time with one other GP. Both partners are fairly close to retirement age. She thinks the area is unusual as most of practice population have lived there all their lives.

	<p>(p2)</p> <p>The practice is not usually an early adopter of e-health systems (p3)</p> <p>xxxx is on the CCG Board and was on the PEC, so regards herself as someone who is “always aware of what’s going on” (p3)</p> <p>Sees herself as being responsible for having heard of things on behalf of other GPs in her locality (p4)</p> <p>Theme about skills sets – “IT doesn’t come naturally to me but I always try to overcome that” and about use of social networking tools (p5)</p> <p>Doesn’t like to use online EBP sources during a consultation (p6)</p> <p>Theme about reflective practice. “I’m a person who considers things in the car after a meeting wishing I’d said that” (p7)</p> <p>Theme about provenance and reliability “weight of evidence” (p8/9)</p> <p>Theme about validating pathways. “It’s part of how I am, because of the experience I’ve got. Local stuff is fine” (p9/10)</p> <p>Theme about using the Map after consultations “previously I’d have asked a colleague, now I use the Map. Have I followed the pathway, what have I omitted?” (p10)</p> <p>Practice Nurse will tend to look at the Map before talking to the GP about a patient (p11)</p> <p>Theme about the pathways on the Map being medicalised (p11)</p> <p>Challenge for CCGs of moving things forward when there is no money around, so pathway design is important (P11)</p> <p>Theme of time in the consultation. Uses the Map to reassure patients, pressure of more complex cases (p13)</p> <p>Map should be part of appraisal and revalidation of GPs (p13)</p> <p>Theme about promoting the adoption of e-health, and having enough resources to demonstrate on an individual basis or in small groups. “It’s not rocket science but you have to have a bit of familiarity” P15/16)</p>
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Appendix 12

Example of a project risk register

Project risk register – as at June 2012

Probability	Value	Description
Low	1	Unlikely but not impossible (0-20% chance)
Medium	2	Fairly likely to happen (20-50% chance)
High	3	More likely to happen than not (>50% chance)

Impact	Value	Description
Low	1	Small delay, increase in costs, shortfall in project outcomes, impact on researcher
Medium	2	Significant delay, increase in costs, shortfall in project outcomes, impact on researcher
High	3	Major delay, increase in costs, shortfall in project outcomes, impact on researcher

Risk no.	Risk description	Probability (P)	Impact (I)	Risk factor (Pxl) Scale of risk: <2 = low risk 2-4 = medium risk 5+=high risk	Action
1	No funding for transcription of interviews	2	2	Risk closed	<ul style="list-style-type: none"> Experiment with digital dictation to re-record interviews in own voice, and then use voice recognition software to produce transcriptions (this was not successful). Apply for time of secretarial staff in PCT HQ. (Request refused). Fall back position is to do transcription myself. Zero cost but will have impact on timescales.
2	Low response rate to online questionnaire from GPs	2	2	Risk closed	<ul style="list-style-type: none"> Publicise project via <i>Local Practice</i>, the PCT newsletter for GPs. Send covering letter from the PCT Medical Director, together with a link to the online questionnaire

					<ul style="list-style-type: none"> Reminder email to be sent out in name of one of the GPs on the CCG
3	Low response rate to online questionnaire from PCT clinicians	1	2	Risk closed	<ul style="list-style-type: none"> Publicise project via <i>Focus</i>, the newsletter for PCT staff. Give a presentation about the project to the Provider Division Management Team, and to Pathway team meetings Send covering letter from the PCT Director of Provider Services, together with a link to the online questionnaire
4	Not clear if the project will require formal NHS Local Research Ethics approval			Risk Closed	<ul style="list-style-type: none"> Discuss project with PCT Clinical Governance lead Contact Greater Manchester R&D Group to seek clarification
5	Lack of experience in the analysis of qualitative data	2	2	4	<ul style="list-style-type: none"> Offer to work on a qualitative research project run by University of Manchester, to gain some experience (project subsequently cancelled) Attend 2 day course on qualitative analysis run by University of Oxford Try to identify more experienced qualitative researchers to network with
6	Lack of time to devote to the research project	2	2	4	<ul style="list-style-type: none"> Negotiate with my line manager to get agreement to set time aside (approximately one half day per week for the research?) This risk may increase due to probability of increased workload arising from redundancies in other parts of the Trust.
7	Loss of personal motivation to continue with the project	1	3	3	<ul style="list-style-type: none"> Keep up regular contact with my academic and practice-based supervisors Maintain my research diary, to keep notes on what I have done and why I did it. Network with other students on the PD programme, so that

					<p>we can provide support and encouragement to each other</p> <ul style="list-style-type: none"> • Network with people interested in similar research topics, eg contacts made through the CfH Evaluation Programme.
8	Difficulty in gaining access to key people and relevant documents eg business case from NHS Connecting for Health	2	2	4	<ul style="list-style-type: none"> • Investigate what documents are in the public domain • Arrange to go and talk to the relevant staff at the SHA and CfH • Discuss approaches used by the academic researchers involved in the CfH Evaluation Programme
9	Difficulty in maintaining a positive working relationship with my supervisors	1	2	2	<ul style="list-style-type: none"> • Discuss with them what support or guidance they feel they can offer • Agree with them a frequency and a format for keeping them informed about progress, and about any problems being encountered
10	GPs unwilling to participate in semi-structured interviews	2	3	6	<ul style="list-style-type: none"> • Follow up GPs who attended TARGET awareness session • Seek advice from xxxx on which GPs to approach • Consider purposive sampling approach
11	Community health clinicians unwilling to participate in semi-structured interviews	1	3	3	<ul style="list-style-type: none"> • Some volunteers identified from online survey • Consider purposive sampling approach • Seek advice from Associate Directors
12	Need to address issues around analysis of qualitative data, subjectivity and inter-rater reliability	2	3	6	<ul style="list-style-type: none"> • Seek advice from xxxx (PCT Clinical Governance Lead) on possible contacts with experience of doing qualitative research, advice on coding frameworks etc • Work with another PD student to review each other's coding frameworks

Appendix 13

Example of an SHA benefits summary

Map of Medicine Benefits Summary for the XXX Strategic Health Authority

What is the benefit and for whom?	What will be the outcome and for whom?	Measurement
<p>Benefit 1</p> <p>A shared reference system for Clinical Pathways will mean that National Health Service staff and others involved in the care of patients will have a reference point and standard set of clinical pathways .</p>	<p>Service Planners will have a process to draw on when defining patient journeys.</p> <p>New and amended Patient Pathway development should increase as a result of the increase in productivity.</p> <p>Communications and co-operation across organisations will be assisted by having a co-ordinated national system with locally managed user views.</p> <p>The Healthcare Provider will benefit from a reduction in accidental duplication in the creation of new or amended clinical pathways, saving time and leading to cost savings.</p> <p>Patients will benefit as newly designed clinical pathways come on stream faster and improve patient journeys.</p> <p>Clinicians will be able to draw on national benchmarks.</p>	<p>Reports of usage from Map of Medicine.</p>
<p>Benefit 2</p> <p>Clinicians in primary and secondary care will save time and effort as they will not have to synthesize the vast array of clinical guidelines, evidence and published research.</p>	<p>Clinical Staff will save time by not having to research the constantly changing evidence-based resources. Those which are relevant will be presented within the system.</p> <p>There will be increased patient safety with more informed clinicians and regularly reviewed pathways in relation to new evidence and alerts.</p>	<p>Survey of clinical users of the Map.</p>

What is the benefit and for whom?	What will be the outcome and for whom?	Measurement
<p>Benefit 3</p> <p>Clinical Staff will be able to use the Clinical Pathways Tool for professional development as part of their learning experience</p>	<p>Clinical Staff who undertake professional development and possible professional qualifications will be able to refer to the tool as part of their education and gain extra knowledge as part of wider professional and educational development.</p> <p>On-the-job training and information sharing on the delivery of care will be made easier for clinical staff.</p>	<p>Measure the impact on professional development and more formal qualifications</p> <p>Better competencies and improved confidence in staff in existing and new roles</p>
<p>Benefit 4</p> <p>Patients will be able to receive information in paper or electronic form on prevention, diagnosis and treatment they are to receive whilst receiving care.</p>	<p>There will be increased patient understanding of the process, helping to improve the relationship between the clinician and patient.</p> <p>The increased patient participation and confidence in the treatment regime may reduce the chances of patient non-attendance or non-compliance throughout the patient journey.</p>	<p>Patient satisfaction survey.</p>
<p>Benefit 5</p> <p>The ability to amend and re-publish the clinical pathway locally will mean that a wide number of service planners and project teams will have access to an appropriate and up-to-date pathway.</p> <p>Local clinicians in primary and secondary care will benefit from improved communications to them on any new locally agreed processes/clinical pathways.</p> <p>Authorised Service Planners outside the health community will have the benefit of viewing on-line the new patient journey developed by this functionality.</p>	<p>Pathways will remain up-to date.</p> <p>Primary and Secondary Care Clinicians will have a responsive knowledge base on the new improved patient pathway.</p> <p>Staff are able to respond rapidly to local or national initiatives by altering or re-designing the pathway as needed.</p> <p>Patients receive up to date care based on current pathway.</p>	<p>Measure outcomes before and following introduction of pathway.</p>

What is the benefit and for whom?	What will be the outcome and for whom?	Measurement
Patients will benefit from the up to date information.		

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